

SILVER VALLEY UNIFIED SCHOOL DISTRICT



Yermo School's New Gym Project

BID No. 20240270-01

BID AND CONTRACT DOCUMENTS

Bid Packages Due on or Before:

December 3, 2024 – 2:00 p.m.

**ATTN: Robert Saffel
Silver Valley Unified School District
35320 Daggett-Yermo Road
Yermo, CA 92398**

**Silver Valley Unified School District
Yermo School's New Gymnasium Project
Bid No. 20240270-01**

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SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's new Gymnasium Project

BID No. 20240270-01

**SECTION 1
NOTICE TO BIDDERS**

NOTICE TO BIDDERS

NOTICE IS HEREBY GIVEN that the Silver Valley Unified School District (“District”) will receive bids up to, but not later than **02:00 p.m. on December 3, 2024** sealed bids for the award of a contract for:

BID NO. 20240270-01

Yermo School’s New Gymnasium Project

Bids shall be received in the Department of Technology, Maintenance & Operations at 35320 Daggett-Yermo Rd, Yermo, CA 92327, and shall be opened and publicly read aloud at the above state time and place. Responses must be sealed and clearly marked **“Yermo School’s New Gymnasium Project, BID NO. 20240270-01.”** Facsimile or electronic copies of the bid will not be accepted. Bids received after the above-specified date and time will be rejected.

Each bid must conform and be responsive to this notice and all other documents comprising the contract documents. All interested parties may obtain additional information by contacting the District’s Department of Technology, Maintenance, and Operations, 35320 Daggett-Yermo Road, Yermo, CA 92327 or via email request to notify Robert Saffel, the District’s Senior Director of Technology, Maintenance, and Operations, at rsaffel@svusdk12.net.

Prospective bidders may secure bid documents from **AI PlanRoom @ www.aandiplanroom.com**. Bid documents are available from A&I Reprographics by creating an account and logging on to: www.aandiplanroom.com or by calling 909-514-0704 or by email: bid@aandirepro.com. There is a non-refundable fee for obtaining a printed set of documents or a digital download. Any changes via addenda will be available on the A&I Reprographics site at www.aandiplanroom.com.

A mandatory site walk is scheduled for Tuesday, November 12th at 10:00 a.m., at Yermo School, 38280 Gleason St, Yermo, CA 92398.

All forms must be completed, signed, and returned with the bid. No bidder may withdraw its bid for a period of sixty (60) calendar days after the date set for the receipt of bids. The successful bidder shall file a payment bond issued by an admitted Surety authorized to conduct business in the State of California approved by the District. A performance bond will also be required.

This Project is a public works project and is subject to the payment of prevailing wages. The Director of Industrial Relations has determined the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of worker needed to execute the contract that will be awarded to the successful bidder, copies of which are available to the public on the internet at <http://www.dir.ca.gov/DLSR/> or from the Facilities, Planning and Construction Department, upon request.

The successful bidder and all subcontractor(s) shall comply with all applicable Labor Code provisions, which include, but are not limited to, the payment of not less than the required prevailing rates to all workers employed by them in the execution of the Contract, the employment of apprentices, the hours of labor and the debarment of contractors and subcontractors.

Each Bidder submitting a bid must be a Department of Industrial Relations registered contractor pursuant to Labor Code section 1725.5 (“DIR Registered Contractor”), unless an exception expressly provided in the Labor Code applies. This project is subject to compliance monitoring and enforcement by the DIR. If awarded the Contract, at all times during performance of the work, the Bidder and all Subcontractors of any tier shall be DIR Registered Contractors and continue to comply with all DIR requirements.

Disabled Veteran Contractors are encouraged to submit bids. This bid is subject to Disabled Veteran Business

Enterprise requirements.

Each bidder shall be a licensed contractor pursuant to the Business and Professions Code and shall be licensed in the following classifications **(B) General Building Contractor**. No bid will be accepted from a contractor who has not been licensed in accordance with the California Business and Profession Code at the time the bid is submitted.

The District reserves the right to reject any or all bids, to accept or reject any one or more items of a bid, or to waive any irregularities or informalities in the bid or in the bidding process.

Signed: Robert Saffel,
Senior Director of Technology, Maintenance & Operations
SILVER VALLEY UNIFIED SCHOOL DISTRICT

Date: 9/26/2024

Publication Dates: Sunday, October 27th , 2024 and Sunday, November 3rd, 2024

SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's new Gymnasium Project

BID No. 20240270-01

**SECTION 2
INSTRUCTIONS
TO BIDDERS**

INSTRUCTIONS TO BIDDERS

1. Preparation and Availability of Bid Form; Deadline for Receipt of Bids

Each bid on the attached form shall be sealed and submitted to the District at such time and place as is stated in the Notice Inviting Bids, not later than **2:00 p.m. on December 3, 2024**. The District suggests that bids be hand delivered in order to ensure their timely receipt. Any bids received after the date and time stated, regardless of the reason, shall be returned, unopened, to the bidder. The District will not accept any bids or bid modifications submitted by facsimile or electronic mail transmission.

Bids shall only be prepared using the copy of the Bid Form, which is included and part of the Contract Documents for the Project. The use of substitute bid forms other than clear and correct photocopies of those provided by the District will not be permitted. Bids shall be received in the Department of Technology, Maintenance & Operations for the Silver Valley Unified School District, located at 35320 Daggett-Yermo Rd, Yermo, CA 92327.

All blanks in the bid form must be appropriately filled in, and all prices must be stated in both words and figures. All items on the form shall be filled out in ink. Numbers should be stated in figures, and the signatures of all individuals must be in long hand. The completed form should be without interlineations, alterations, or erasures. If a different price is stated in words than is stated in figures, the price stated in words shall be the price bid.

The District may receive requests for the Contract Documents from plan rooms. Please note Prospective bidders may secure bid documents from **AI PlanRoom @ www.aandiplanroom.com**. Bid documents are available from A&I Reprographics by creating an account and logging on to: www.aandiplanroom.com or by calling 909-514-0704 or by email: bid@aandirepro.com.

There is a non-refundable fee for obtaining a printed set of documents or a digital download. Any changes via addenda will be available on the A&I Reprographics site at www.aandiplanroom.com.

Any clarification the District deems necessary as a result of questions received or to further clarify the bid documentation will be done via an addendum and shall be distributed to all firms participating in this opportunity who are known to have received a copy of the bid documents. Vendors shall contact the District to ensure they have receive all addenda issued.

2. Execution of Forms

Each bid shall give the full business address of the bidder and must be signed by the bidder or bidder's authorized representative with his or her usual signature. Bids by partnerships must furnish the full names of all partners and must be signed in the partnership name by a general partner with authority to bind the partnership in such matters. Bids by corporations must be signed with the legal name of the corporation, followed by the signature and designation of the president, secretary, or other person authorized to bind the corporation in this matter. The name of each person signing shall also be typed or printed below the signature. When requested by the District, satisfactory evidence of the authority of the officer signing on behalf of the corporation or partnership shall be furnished. A bidder's failure to properly sign required forms may result in rejection of the bid. All bids must include the bidder's contractor license number(s) and expiration date(s).

3. Requests for Information

A bidder's failure to request clarification or interpretation of an apparent error, inconsistency or ambiguity in the Contract Documents waives that bidder's right to thereafter claim entitlement to additional compensation based upon an ambiguity, inconsistency, or error, which should have been discovered by a reasonably prudent Contractor, subject only to the limitations of Public Contract Code § 1104. To the

fullest extent permitted by law District expressly disclaims responsibility for assumptions a bidder may draw from the presence or absence of information in the bid documents. Any questions relative to the bid shall be in writing and directed to Robert Saffel, the District's Senior Director of Technology, Maintenance & Operations, at the address specified for receipt of bid proposals. Any questions pertaining to the bid documents are to be directed **via e-mail only** to Robert Saffel, the District's Senior Director of Technology, Maintenance & Operations, at rsaffel@svusdk12.net. Questions must be received before **12:00 p.m. on Wednesday, November 20, 2024, questions received after this time will NOT be addressed.**

4. Bid Security

Bid proposals shall be accompanied by a certified or cashier's check or bid bond for an amount not less than ten percent (10%) of the bid amount, payable to the District. A bid bond shall be secured from an admitted surety company, licensed in the State of California, and satisfactory to the District. The bid security shall be given as a guarantee that the bidder will enter into the Contract if awarded the work, and in the case of refusal or failure to enter into the Contract within ten (10) calendar days after notification of the award of the Contract or failure to provide the payment and performance bonds and proof of insurance as required by the Contract Documents, the District shall have the right to award the Contract to another bidder and declare the bid security forfeited. The District reserves the right to pursue all other remedies in law or equity relating to such a breach including, but not limited to, seeking recovery of damages for breach of contract. Failure to provide bid security, or bid security in the proper amount, may result in rejection of the bid.

5. Faxed and Electronic Mail Bids

All bids must be under sealed cover. District will not accept any bids or bid modifications submitted by facsimile or electronic mail transmission.

6. Withdrawal of Bids

Bid proposals may be withdrawn by the bidders prior to the time fixed for the opening of bids, but may not be withdrawn for a period of sixty (60) days after the opening of bids, except as permitted pursuant to Public Contract Code § 5103.

7. Addenda or Bulletins

The District reserves the right to issue addenda or bulletins prior to the opening of the bids subject to the limitations of Public Contract Code § 4104.5. Any addenda or bulletins issued prior to bid time shall be considered a part of the Contract Documents.

Please note: Bidders are responsible for ensuring that they have received any and all addenda. To this end, each Bidder should contact Robert Saffel, the District's Senior Director of Technology, Maintenance & Operations, at rsaffel@svusdk12.net to verify that he/she has received all Addenda issued, if any, prior to the bid opening.

8. Agreements and Bonds

The Agreement form, which the successful Bidder, as Contractor, will be required to execute, and the forms and amounts of surety bonds, which will be required to furnish at the time of execution of the Agreement, are included in the Contract Documents and shall be carefully examined by the Bidder. The required number of executed copies of the Agreement, the Performance Bond, and the Payment Bond is as specified in the Special Conditions.

The successful bidder shall be required to submit payment and performance bonds as specified in and using the bond forms included with the Contract Documents. All required bonds shall be based on the maximum total contract price as awarded, including additive alternates, if applicable. The Performance Bond must be executed by an admitted surety insurer approved to conduct business in the State of California which meets the highest standards the District is legally permitted to establish and which it has established. The District reserves the right to approve or reject the surety insurer selected by the Contractor and to require the Contractor to obtain a bond from a surety satisfactory to the District. Bonds shall be in the form set forth in the Contract Documents.

9. Signing of Bids

All Bids submitted shall be executed by the Bidder or its authorized representative. Bidders may be asked to provide evidence in the form of an authenticated resolution of its Board of Directors or a Power of Attorney evidencing the capacity of the person signing the Bid to bind the Bidder to each Bid and to any Contract arising therefrom.

If a Bidder is a joint venture or partnership, it may be asked to submit an authenticated Power of Attorney executed by each joint venturer or partner appointing and designating one of the joint venturers or partners as a management sponsor to execute the Bid on behalf of Bidder. Only that joint venturer or partner shall execute the Bid. The Power of Attorney shall also: (1) authorize that particular joint venturer or partner to act for and bind Bidder in all matters relating to the Bid; and (2) provide that each venturer or partner shall be jointly and severally liable for any and all of the duties and obligations of Bidder assumed under the Bid and under any Contract arising therefrom. The Bid shall be executed by the designated joint venturer or partner on behalf of the joint venture or partnership in its legal name.

10. Award of Contract and Rejection of Bids

The Contract shall be awarded to the lowest responsible and responsive bidder as interpreted by the District under California law and the Contract Documents, including the Notice to Bidders and these Instructions. The District reserves the right, without any liability, to cancel the award of any bid for any reason at any time before the full execution of the Agreement between District and Contractor.

The District may reject any bid which, in its opinion when compared to other bids received or to the District's internal estimates, does not accurately reflect the cost to perform the Work. The District may reject as non-responsive any bid which unevenly weights or allocates costs, including but not limited to overhead and profit to one or more particular bid items.

The District reserves the right to reject any or all bids, or to waive any irregularities or informalities in any bid or in the bidding process.

11. Execution of Contract

The successful bidder shall, within ten (10) calendar days of the Notice of Intent to Award of the Contract, sign and deliver to the District the executed contract along with the bonds and certificates of insurance required by the Contract Documents. In the event the successful bidder fails or refuses to execute the Contract or fails to provide the bonds and certificates as required, the District may declare the bidder's bid deposit or bond forfeited as liquidated damages, and may award the work to the next lowest responsible, responsive bidder, or may reject all bids and, in its sole discretion, call for new bids. In all cases, the District reserves the right, without any liability, to cancel the award of Contract at any time prior to the full execution of the Contract.

12. Modifications

Each Bidder shall submit its Bid in strict conformity with the requirements of the Contract Documents. Unauthorized additions, modifications, revisions, conditions, limitations, exclusions or provisions attached to a Bid may render it non-responsive and may cause its rejection. Bidders shall neither delete, modify, nor supplement the printed matter on the Bid Forms, nor make substitutions thereon. Oral, telephonic and electronic modifications will not be considered, unless the Notice to Bidders authorizes the submission of electronic bids and modifications thereto and such modifications are made in accordance with the Notice to Bidders.

13. Erasures/Mutilation of Bid Documents

The Bid submitted must not contain any erasures, interlineations, or other corrections unless each such correction is suitably authenticated by affixing in the margin immediately opposite the correction the surname or surnames of the person or persons signing the bid.

Contractors should not deface or mutilate the bid documents to the extent that they may not be usable for construction purposes. Bid documents obtained under deposit shall be returned within ten (10) days after bid opening.

14. Examination of Site and Contract Documents

Each Bidder shall visit the site of the proposed work and fully acquaint itself with the conditions relating to the construction and labor so that it may fully understand the facilities, difficulties, and restrictions attending the execution of the work under the Contract. Bidders shall thoroughly examine and be familiar with the Drawings and Specifications. All Drawings, Specifications and other documents used or prepared during the project shall be the exclusive property of the District. The failure or omission of any Bidder to receive or examine any Contract Documents, forms, instruments, addenda, or other documents or to visit the site(s) and acquaint itself with conditions there existing shall in no way relieve any Bidder from obligations with respect to its bid or to the Contract. The Bidder is responsible to obtain any geotechnical and/or soils report pertaining to the site of the work at Bidder's expense, if applicable. Although any such report does not operate as a warranty or guarantee of site conditions, the submission of a Bid shall be taken as prima facie evidence of compliance with all terms of this section.

Discrepancies in, and/or omissions from the Plans, Specifications or other Contract Documents or questions as to their meaning shall be immediately brought to the attention of the District by submission of a written request for an interpretation or correction to the District. Such submission, if any, must be sent to Robert Saffel, the District's Senior Director of Technology, Maintenance & Operations, at rsaffel@svusdk12.net.

Any interpretation of the Contract Documents will be made only by written addenda duly issued and mailed or delivered to each person or firm who has obtained a set of Contract Documents directly from the District. The District will not be responsible for any explanations or interpretations provided in any other manner. No person is authorized to make any oral interpretation of any provision in the Contract Documents to any Bidder, and no Bidder should rely on any such oral interpretation.

Bids shall include complete compensation for all items that are noted in the Contract Documents as the responsibility of the Contractor.

- (a)** Each Bidder, by making its bid, represents that it has read and understands the Contract and Contract Documents and any and all related reports and information. After executing the Agreement, no consideration will be given to any claim of misunderstanding of the documents.
- (b)** Each Bidder, by making its bid, represents that it has visited the site(s), inspected the area of the work, and familiarized itself with the local conditions under which the work is to be performed,

including sub-surface conditions, as appropriate. Such inspection shall specifically consider requirements for accessing the site and determining the work can be completed as required by, and as shown in, the Contract Documents.

- (c) No bidder shall visit the site without prior authorization of the District. Bidders shall contact Robert Saffel, the District's Senior Director of Technology, Maintenance & Operations, at rsaffel@svusdk12.net or designee for coordination of site visits.

15. Sales and Other Applicable Taxes, Permits, and Fees

Contractor and its subcontractors performing work under this Contract will be required to pay California sales tax and other applicable taxes, and to pay for permits, licenses and fees required by the agencies with authority in the jurisdiction in which the work will be located, unless otherwise expressly provided by the Contract Documents.

16. Evidence of Responsibility

Upon the request of the District, a Bidder whose bid is under consideration for the award of the Contract shall submit promptly to the District satisfactory evidence showing the Bidder's financial resources, the Bidder's construction experience in the type of work being required by the District, and the Bidder's organization available for the performance of the Contract and any other required evidence of the Bidder's qualifications to perform the Contract. The District may consider such evidence before making its decision awarding the Contract. Failure to submit requested evidence of a Bidder's responsibility to perform the Contract may result in rejection of the Bid.

17. Bid Exceptions

Bid exceptions are not allowed. If the Bidder has a comment regarding the bid documents or the scope of work, the Bidder shall submit those comments to the District for evaluation at least five (5) working days prior to the opening of the bids. No oral or telephonic modification of any bid submitted will be considered and a sealed written modification may be considered only if received prior to the opening of bids. Emailed or faxed bids or modifications will not be accepted.

18. Discounts

Any discounts which the bidder desires to provide the District must be stated clearly on the bid form itself so that the District can calculate the net cost of the bid proposal. Offers of discounts or additional services not delineated on the bid form will not be considered by the District in the determination of the lowest responsible responsive bidder.

19. Quantities

The quantities shown on the plans and specifications are approximate. The District reserves the right to increase or decrease quantities as desired.

20. Prices; Containers Costs and Delivery

Bidders must quote prices F.O.B. unless otherwise noted. Prices should be stated in the units specified and bidders should quote each item separately. All costs for containers shall be borne by the bidder. All products shall conform to the provisions set forth in the federal, county, state and city laws for their production, handling, processing and labeling. Packages shall be so constructed to ensure safe transportation to the point of delivery.

21. Samples

On request, samples of the products being bid shall be furnished to the District.

22. Substitutions

In describing any item, the use of a manufacturer or brand does not restrict bidding to that manufacturer or brand, but is intended only to indicate quality and type of item desired, except as provided in Public Contract Code § 3400. Substitute products may be considered either prior to or after the award of the Contract in accordance with § 3400 and as set forth in either the Special Conditions or the Specifications. All data substantiating the proposed substitute as an “equal” item shall be submitted with the written request for substitution. The District reserves the right to make all final decisions on product and vendor selection.

IF A PROPOSED SUBSTITUTION IS REJECTED, BIDDER SHALL BE RESPONSIBLE FOR PROVIDING THE ITEM OR PRODUCT OR WORK AS ORIGINALLY SPECIFIED AT NO ADDITIONAL COST TO THE DISTRICT. THE DISTRICT HAS THE COMPLETE AND SOLE DISCRETION TO DETERMINE IF AN ITEM OR ARTICLE IS AN EQUAL ITEM.

23. Bid Negotiations

A bid response to any specific item of the bid using terms such as “negotiable,” “will negotiate,” or similar phrases, will be considered non-responsive.

24. Prevailing Law

In the event of any conflict or ambiguity between these instructions and state or federal law or regulations, the latter shall prevail. All equipment to be supplied or services to be performed under the bid proposal shall conform to all applicable requirements of local, state and federal law, including, but not limited to, Labor Code §§ 1771, 1778 and 1779.

25. Allowances

An “allowance” means an amount included in the bid proposal for work that may or may not be included in the Project, depending on conditions that will become known only after the Project is underway.

26. Bidders Interested in More Than One Bid and Bidders Not Qualified to Bid

No person, firm, or corporation shall be allowed to make, or file, or be interested in more than one bid for the same work unless alternate bids are specifically called for. A person, firm, or corporation that has submitted a sub-proposal to a Bidder, or that has quoted prices of materials to a Bidder, is not thereby disqualified from submitting a sub-proposal or quoting prices to other Bidders or making a prime proposal. No person, firm, or corporation shall be allowed to bid who has participated in the preparation of contract specifications; a bid by such a person, firm, or corporation shall be determined to be nonresponsive.

27. Additive and Deductive Items – Method of Determining Basis of Award

Pursuant to Public Contract Code §20103.8, should this bid solicitation include additive and/or deductive items, the checked [X] method shall be used to determine the lowest bid:

_____ (a) The lowest bid shall be the lowest bid price on the each respective base bid section contract without consideration of the prices on the additive or deductive items.

XX (b) The lowest bid shall be the lowest total of the bid prices on the base contract and those additive or deductive items that were specifically identified in the bid solicitation as being used for the purpose of determining the lowest bid price.

_____ (c) The lowest bid shall be the lowest total of the bid prices on the base contract and those additive or deductive items taken in order from a specifically identified list of those items that, when in the bid form and added to, or subtracted from, the base contract, are less than, or equal to, a funding amount publicly disclosed by the District before the first bid is opened.

_____ (d) The lowest bid shall be determined in a manner that prevents any information that would identify any of the Bidders from being revealed to the public entity before the ranking of all Bidders from lowest to highest has been determined.

If no method is checked, sub-paragraph (a) shall be used to determine the lowest bid.

Notwithstanding the method used by the District to determine the lowest responsible Bidder, the District retains the right to add to or deduct from the Contract any of the additive or deductive items included in the bid solicitation.

28. Listing Subcontractors

Pursuant to the Subletting and Subcontracting Fair Practices Act, Public Contract Code §§ 4100 et seq., every bidder shall, on the enclosed Subcontractor List Form, set forth:

- (a) The name, license number, and location of the place of business of each Subcontractor who will perform work or labor or render service to the bidder in or about the work or fabricate and install work in an amount in excess of one-half of the one percent (0.5%) of the bidder’s total bid.
- (b) If the bidder fails to specify a Subcontractor for any portion of the work to be performed under the Contract in excess of one-half of one percent (0.5%) of the bidder’s total bid, bidder agrees that bidder is fully qualified to and shall perform that portion of the work. The successful bidder shall not, without the written consent of the District or compliance with Public Contract Code §§ 4100 et seq., either:
 - 1) Substitute any person as Subcontractor in place of the Subcontractor designated in the original bid;
 - 2) Permit any subcontract to be voluntarily assigned or transferred or allow the work to be performed by anyone other than the original Subcontractor listed in the bid; or
 - 3) Sublet or subcontract any portion of the work in excess of one-half of one percent (0.5%) of the total bid as to which the bidder’s original bid did not designate a Subcontractor.

29. Form and Approval of Contract

The Contract Documents must be approved by the Board of Trustees of the District and its legal counsel. The bidder selected by the District shall execute the contract provided by the District.

30. Denial of Right to Bid

Contractors or Subcontractors who have violated state law governing public works shall be denied the right to bid on this public works contract pursuant to Labor Code § 1777.1.

31. Contractor’s State License Board and Certifications

Contractors and Subcontractors are required by law to be licensed and regulated by the California Contractors’ License Board. Pursuant to Section 7028.15 of the Business and Professions Code and Section 3300 of the Public Contract Code, all Bidders must possess proper licenses for performance of this Contract prior to submittal of bid documents. Subcontractors must possess the appropriate licenses for each specialty subcontracted prior to submittal of bid documents. Pursuant to Section 7028.5 of the Business and Professions Code, the District shall consider any bid submitted by a contractor not currently licensed in accordance with state law and pursuant to the requirements found in the Contract Documents to be non-responsive, and the District shall reject the Bid. The District shall have the right to request, and Bidders shall provide within five (5) calendar days, evidence satisfactory to the District of all valid license(s) currently held by that Bidder and each of the Bidder’s subcontractors, before awarding the Contract.

Bidder must have all certifications and/or factory authorizations required for the project prior to submittal of the Bid including, but not limited to, the specified manufacturer certifications described in the Special Conditions section of this document. Subcontractors must have all certifications and/or factory authorizations required for each specialty subcontract prior to submittal of the Bid including, but not limited to, the specified manufacturer certifications described in the Special Conditions section of this document.

32. Fingerprinting

By law it is the District’s responsibility to determine whether a contractor must provide fingerprint certification. Pursuant to Education Code § 45125.2, the District considers the totality of the circumstances in order to determine if fingerprinting of employees of a contractor working on a school site is required. Factors to be considered include the length of time the contractor’s employees are on school grounds, whether students are in proximity to the location where the contractor’s employees are working, and whether the contractor’s employees are working alone or with others.

33. Labor Compliance Monitoring

The project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations. In accordance with Labor Code § 1771.1, all bidders, contractors and subcontractors working at the site shall be duly registered with the Department of Industrial Relations at time of bid opening and at all relevant times. Proof of registration shall be provided as to all such contractors prior to the commencement of any work.

34. Retention

The Project is not considered substantially complex and therefore requires a standard retention amount of 5%.

35. Disabled Veteran Business Enterprises

Compliance with Disabled Veteran Business Enterprise (“DVBE”) contracting goals is required for this project. Although, minority, women and disabled veteran contractors are encouraged to submit bids.

36. Bid Protests

A bidder may protest the bidding process for the project only by filing a written protest with the Director of Facilities, Planning and Construction, in accordance with the procedures set forth in this section. The District will not consider any verbal protests (e.g., by telephone) or any protests sent by electronic mail. In order for a protest to be valid and considered by the District, the protest must: (a) be filed not later than seventy-two (72) hours after the end of the bid opening; (b) clearly identify the bidder on whose behalf the protest is being filed, together with the name, address and telephone number of the person representing the bidder for purposes of the protest; (c) clearly identify the specific bidding process, bid or award of the Contract being protested; (d) clearly identify and describe in detail the specific basis or bases for the protest and all facts relevant thereto and in support thereof; (e) clearly identify all references to the specific portions of all documents relevant to the protest; (f) clearly identify and describe in detail all arguments in support of the protest, including, without limitation, any citations to all legal authorities; and (g) be submitted with all documentation that is relevant to and supports the basis or bases underlying the protest.

If a protest filed by a Bidder does not comply with each and every one of the foregoing requirements, the District may reject the protest as invalid. If a Bidder files a valid protest, the District shall review the protest and all relevant information and documents and will provide written decision to the protesting bidder. In response to a protest, the District may decline to award a contract, may award a contract to a bidder other than as previously intended, or may award a contract to a bidder as previously intended despite the protest. Such action by the District shall be a condition precedent to the filing of any claim or demand and to the initiation of any action (legal or equitable) or other proceeding arising from the matter(s) protested.

COMPLIANCE WITH THE FOREGOING REQUIREMENTS IS MANDATORY. Each bidder that desires to protest must file a protest in accordance with the foregoing requirements, and no bidder may rely on a protest by another bidder as a means of satisfying such requirements. Compliance with the foregoing requirements is the sole and exclusive means of protesting the bidding process, any bid, and/or the intended award of a contract for the project, and failure to so comply shall be deemed and construed as a waiver of any and all rights the Bidder may have to pursue a claim, demand or action based on the bidding, any bids, and/or any contract awarded for the project.

37. Ethics in Bidding

The District expects the Bidders to maintain high ethical standards in engaging in the competitive bidding process. The bid amount of one Bidder should not be divulged to another before the award of the subcontract or order, nor should it be used by Contractor to secure a lower proposal from another Bidder on that project (bid shopping). Subcontractors or suppliers should not request information from the Contractor regarding any sub-bid in order to submit a lower proposal on that project (bid peddling). The District will consider any Bidder found to be engaging in such practices to be a non-responsible Bidder and may reject its bid on that ground.

38. Insurance Requirements

The successful Bidder shall procure the insurance in the form and in the amount specified in the Contract Documents.

39. Debarment of Contractors and Subcontractors

In accordance with the provisions of the Labor Code, contractors or subcontractors may not perform work on a public works project with a subcontractor who is ineligible to perform work on a public project pursuant to Labor Code sections 1777.1 or 1777.7. Any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid to a debarred subcontractor by the Contractor for the Project shall be returned to the District. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the Project.

40. Public Records

All documents included in the bids become the exclusive property of the District upon submittal to the District. All Bids and other documents submitted in response to the Notice to Contractors Calling for Bids become a matter of public record, except for information contained in such bids deemed to be trade secrets, as defined in California Civil Code Section 3426.1. A Bidder that indiscriminately marks all or most of its Bid as exempt from disclosure as a public record, whether by the notations of "Trade Secret," "Confidential," "Proprietary," or otherwise, may render the Bid 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 Bids 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 bids, by request made to the District in conformity with the California Public Records Act, Government Code § 7920.000 et seq.

[END OF INSTRUCTIONS TO BIDDERS]

SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's New Gymnasium Project

BID No. 20240270-01

**SECTION 3
BID FORMS**

BID FORM AND PROPOSAL

To: Governing Board of the Silver Valley Unified School District ("District")

From: _____

(Insert Proper Name of Bidder)

The undersigned declares that the Contract Documents including, without limitation, the Notice to Bidders and the Instructions to Bidders have been read and agrees and proposes to furnish all necessary labor, materials, and equipment to perform and furnish all work in accordance with the terms and conditions of the Contract Documents, including, without limitation, the Drawings and Specifications of the **Yermo School's New Gymnasium Project, Bid No. 20240270-01** ("Project") and will accept in full payment for that Work the following total lump sum amount, all taxes included:

BASE BID:

For the sum of:

_____ **DOLLARS**

(\$ _____), including all applicable taxes, permits and licenses.

CASH ALLOWANCE IN BASE BID

A Cash Allowance of \$100,000.00 will be included for unforeseen purposes. Include in the bid for the Base Bid.

Unit prices stated below shall assume providing and installing the items specified. Prices provided shall be valid through 60 Days

The undersigned has checked carefully all the above figures and understands that the District is not responsible for any errors or omissions on the part of the undersigned in making this bid.

Enclosed find certified or cashier's check no. _____ of the _____ Bank for _____ Dollars

(\$ _____) or Bidder's Bond of the _____ surety company in an amount of not less than ten percent (10%) of the entire bid. The undersigned further agrees, on the acceptance of this proposal, to execute the Contract, provide the required bonds and insurance, and that, in case of default in executing these documents within the time fixed by the Contract Documents, the proceeds of the check or bond accompanying this bid shall be forfeited and shall become the property of the District.

- Alternates.** (Refer to section 01 20 00, Price and payment procedures for full description of alternates. Refer to Project Manual)

ADDITIVES

Item #	Additives	Unit	Price
1	Concrete material option for parking lot		
2			
3			

Descriptions of alternates are primarily scope definitions and do not necessarily detail the full range of materials and processes needed to complete the construction.

- Contractor agrees to commence the work within the time specified in the Notice to Proceed. It is understood that this bid is based upon completing the work within the number of calendar days specified in the Contract Documents.
- The liquidated damages clause of the General Conditions and Special Conditions is hereby acknowledged.
- The following documents are attached hereto in the bid response:
 - Bid Form and Proposal; Section 3 Bid Forms, Page 1-3**
 - Bid Bond; Section 3 Bid Forms, Page 4**
 - Designated Subcontractors List; Section 3 Bid Forms, Page 5-6**
 - Non-Collusion Affidavit, Section 3 Bid Forms, Page 7**
 - Project Warranty, Section 3 Bid Forms, Page 8**
 - Worker’s Compensation Certification; Section 10 Project Forms & Certifications, Page 3**
 - Drug-Free Workplace Certification; Section 10 Project Forms & Certifications, Page 4**
 - Certification Regarding Debarment, Section 10 Project Forms & Certifications, Page 11**
 - Contractor’s Certificate Regarding DVBE; Section 10 Project Forms & Certifications, Page 14**
- Receipt and acceptance of the following Addenda is hereby acknowledged:

Addendum No. 1 _____ Dated: _____

Addendum No. 2 _____ Dated: _____

Addendum No. 3 _____ Dated: _____

Addendum No. 4 _____ Dated: _____

Addendum No. 5 _____ Dated: _____

- Bidder expressly acknowledges that it is aware that if a false claim is knowingly submitted (as the terms "claim" and "knowingly" are defined in the California False Claims Act, Cal. Gov. Code, §12650 et seq.), the District will be entitled to civil remedies set forth in the California False Claim Act. It may also be considered fraud and the Contractor may be subject to criminal prosecution.

7. The undersigned Bidder certifies that it is, at the time of bidding, and shall be throughout the period of the contract, licensed by the State of California to do the type of work required under the terms of the Contract Documents. Bidder further certifies that it is regularly engaged in the general class and type of work called for in the Contract Documents.

Furthermore, Bidder hereby certifies to the District that all representations, certifications, and statements made by Bidder, as set forth in this bid form, are true and correct and are made under penalty of perjury.

Dated this _____ day of _____, 20__

Name of Bidder _____

Type of Organization _____

Signature _____

Signed by _____

Title of Signer _____

Address of Bidder _____

Bidder's Taxpayer Identification No. _____

Telephone Number _____

Fax Number _____

E-mail _____ Website _____

Contractor's License No(s): No.: _____ Class: _____ Expiration Date: _____

No.: _____ Class: _____ Expiration Date: _____

No.: _____ Class: _____ Expiration Date: _____

If Bidder is a corporation, affix corporate seal.

Name of Corporation: _____

President: _____

Secretary: _____

Treasurer: _____

Manager: _____

BID BOND

WHEREAS, _____, as Principal, and _____, as Surety, a corporation organized and existing under and by virtue of the laws of the State of _____ and authorized to do business as a surety in the State of California, are held and firmly bound unto the Silver Valley Unified School District ("District"), as Obligee, in the sum of _____ DOLLARS (\$ _____), being not less than ten percent (10%) of the Total Bid Price; for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has submitted a bid to the District to perform all Work required for the **Yermo School's New Gymnasium Project, Bid No. 20240270-01** as set forth in the Notice to Bidders and accompanying Contract Documents.

NOW, THEREFORE, if said Principal is awarded a Contract for the Work by the District and, within the time and in the manner required by the above-referenced Contract Documents, enters into the written form of Contract bound with said Contract Documents, furnishes the required bonds (one to guarantee faithful performance and the other to guarantee payment for labor and materials), furnishes the required insurance certificates and endorsements, and furnishes any other certifications as may be required by the Contract, then this obligation shall be null and void; otherwise it shall 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 notice inviting bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract of the notice inviting bids, or to the work, or to the specifications.

The bid security will be held by the District for ten (10) days after the period for which bids must be held open 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.

In the event suit is brought upon this bond by the District and judgment is recovered, said Surety shall pay all costs incurred by the District in such suit, including reasonable attorneys' fees to be fixed by the court.

SIGNED AND SEALED, this _____ day of _____, 20_____.

Principal

Surety

By: _____
Signature

By: _____
Signature

(SEAL)

(SEAL)

DESIGNATED SUBCONTRACTORS LIST

In compliance with the "Subletting and Subcontracting Fair Practices Act," California Public Contract Code sections 4100 to 4114, and any amendments thereto, each Bidder shall provide the information requested below for each subcontractor who will perform work, labor or render service to Bidder in or about the construction of the Work in an amount in excess of one-half of one percent (greater than 0.5 %) of the Bidder's Total Bid Price and shall further set forth the portion of the Work which will be done by each subcontractor. Bidder shall list only one subcontractor for any one portion of the Work.

If the Bidder fails to specify a subcontractor for any portion of the Work to be performed under the Contract, it shall be deemed to have agreed to perform such portion itself, and shall not be permitted to subcontract that portion of the Work except under the conditions hereinafter set forth below.

Subletting or subcontracting of any portion of the Work in excess of one half of one percent (greater than 0.5%) of the Total Bid Price for which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after District approval.

Project: **Yermo School's New Gymnasium Project, Bid No. 20240270-01**

Name of Bidder: _____

**Bidder's
Authorized Signature:** _____

<u>Name and Location of Subcontractor</u>	<u>Description of Work to be Subcontracted</u>
Name: _____	_____
Address: _____	_____
Ph: _____ Fax: _____ License No. _____	_____

~~~~~

|                                               |                                                    |
|-----------------------------------------------|----------------------------------------------------|
| <u>Name and Location<br/>of Subcontractor</u> | <u>Description of Work<br/>to be Subcontracted</u> |
| Name: _____                                   | _____                                              |
| Address: _____                                | _____                                              |
| Ph: _____ Fax: _____ License No. _____        | _____                                              |

~~~~~

<u>Name and Location of Subcontractor</u>	<u>Description of Work to be Subcontracted</u>
Name: _____	_____
Address: _____	_____
Ph: _____ Fax: _____ License No. _____	_____

~~~~~  
Name and Location  
of Subcontractor

Description of Work  
to be Subcontracted

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

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

Ph: \_\_\_\_\_ Fax: \_\_\_\_\_ License No. \_\_\_\_\_

~~~~~  
Name and Location
of Subcontractor

Description of Work
to be Subcontracted

Name: _____

Address: _____

Ph: _____ Fax: _____ License No. _____

~~~~~  
Name and Location  
of Subcontractor

Description of Work  
to be Subcontracted

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

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

Ph: \_\_\_\_\_ Fax: \_\_\_\_\_ License No. \_\_\_\_\_

~~~~~  
Name and Location
of Subcontractor

Description of Work
to be Subcontracted

Name: _____

Address: _____

Ph: _____ Fax: _____ License No. _____

~~~~~  
Name and Location  
of Subcontractor

Description of Work  
to be Subcontracted

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

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

Ph: \_\_\_\_\_ Fax: \_\_\_\_\_ License No. \_\_\_\_\_  
~~~~~

NON-COLLUSION AFFIDAVIT

In accordance with Public Contract Code section 7106, the undersigned declares:

I am the _____ of _____, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ [date], at _____ [city], _____ [state].”

Signature

Typed or Printed Name

Title

Bidder

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

Subscribed and sworn before me [Seal]
This ____ day of _____, 20____

Notary Public in and for
the State of California

PROJECT WARRANTY

We, the undersigned, do hereby warrant and guarantee all products and services described within which we have provided for:

**Yermo School's New Gymnasium
Bid No. 20240270-01**

are in accordance with the Contract Documents and that all such Work as installed will fulfill or exceed all minimum warranty requirements. We agree to repair or replace Work installed by us for a period of at least two years after the date of recording the Notice of Completion, together with any adjacent Work which is displaced or damaged by so doing, that proves to be defective in workmanship, material, or function at no expense to the Silver Valley Unified School District, ordinary wear and tear and unusual abuse or neglect excepted. Manufacturers' and suppliers' warranties may be longer than the two year period described above, but not shorter.

In the event of our failure to comply with the above-mentioned conditions within seven (7) business days, after notification in writing, we, the undersigned, all collectively and separately, hereby authorize the District to have said defective Work, repaired or replaced to be made good, and agree to pay to the District upon demand all moneys that the District may expend in making good said defective Work, including but not limited to all collection costs and reasonable attorneys' fees.

Company Name: _____

Signed: _____
(Contractor's signature)

Name: _____
(printed)

Date: _____

SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's New Gymnasium Project

BID No. 2024-0270-01

**SECTION 4
AGREEMENT**

AGREEMENT

THIS AGREEMENT is made this ____ day of _____ in the County of San Bernardino, State of California, by and between the **Silver Valley Unified School District** (the "District") and _____ (the "Contractor"). The District and Contractor may be referred to herein individually as a "Party" and collectively as the "Parties."

RECITALS

- A. District is contracting for **Yermo School's New Gymnasium Project, Bid No. 20240270-01** ("Project").
- B. Contractor has been selected as the lowest responsible and responsive bidder to perform the work for Project.
- C. District desires that the Contractor complete the Project in accordance with the terms and conditions set forth in this Agreement and all Contract Documents incorporated herein.

NOW, THEREFORE, in consideration of the mutual agreements and covenants contained in this Agreement, and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

ARTICLE 1 - SCOPE OF WORK. The Contractor shall perform within the time stipulated the contract as herein defined, and shall provide all labor, materials, tools, utility services, and transportation to complete in a workmanlike manner all of the work required in connection with the following titled project:

Yermo School's New Gymnasium

Bid No. 20240270-01

in strict compliance with the Contract Documents as specified in Article 4 below, which shall be free from any and all liens and claims from mechanics, material suppliers, subcontractors, artisans, machinists, teamsters, freight carriers, and laborers required for the Project.

ARTICLE 2 - TIME FOR COMPLETION. The Contractor shall mobilize and commence work on the Project at the direction of District staff. Time is of the essence for this Contract and the Contractor shall complete the Project within the period specified in the Special Conditions and in accordance with the schedule for the Project developed by the District and the Construction Manager, if applicable. Any additional projects will be coordinated between the District and Contractor. In entering into this Agreement, Contractor acknowledges and agrees that the duration stipulated herein is adequate and reasonable for the size and scope of the Project.

ARTICLE 3 - CONTRACT PRICE. As full compensation for the Contractor's complete and satisfactory performance of the work and activities described in the Contract Documents, the District agrees to pay Contractor, and Contractor agrees to accept the sum of _____ Dollars (\$ _____), which shall be paid to the Contractor according to the Contract Documents. Payment and performance bonds are to be issued each in the amount of one hundred percent (100%) of the total amount payment under the Contract. Contractor shall adjust the payment and performance bonds if outstanding work exceeds the original amount of the bonds.

The Contract Price is subject to increases or decreases as provided in the Contract Documents. The District shall pay the Contract Price to the Contractor in accordance with the General Conditions.

ARTICLE 4 - COMPONENT PARTS OF THE CONTRACT. The Contract entered into by this Agreement consists of the following Contract Documents, all of which are component parts of the Contract as if herein set out in full or attached hereto:

- Notice to Bidders
- Instructions to Bidders
- Bid Form and Proposal, as accepted
- Bid Bond
- Designated Subcontractors List
- Non-Collusion Affidavit
- Project Warranty Agreement
- Performance Bond
- Payment Bond
- General Conditions
- Special Conditions
- Drawings and Specifications
- Notice of Intent to Award
- Notice to Proceed
- Workers' Compensation Certification
- Drug-Free Workplace Certification
- Contractor Certification Re Alcoholic Beverage and Tobacco Free Campus Policy
- Contractor Fingerprinting Certification
- Asbestos-Free Materials Certification
- Bidder's Acknowledgement of Project Schedule
- Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- Iran Contracting Act Certificate
- Substitution Request Form, if applicable
- Escrow Agreement for Security Deposit in Lieu of Retention, if applicable
- Contractor's Certificate Regarding Participation of Disabled Veteran Business Enterprises
- Addenda Nos. _____, _____, _____, as issued

All of the above-named Contract Documents are intended to be complementary. Work required by one of the above-named Contract Documents and not by others shall be done as if required by all. This Agreement shall supersede any prior agreement of the Parties.

ARTICLE 5 – PREVAILING WAGES. This Project is a public works project subject to prevailing wage requirements and Contractor and its Subcontractors are required to pay all workers employed for the performance of this Contract no less than the applicable prevailing wage rate for each such worker. Contractor acknowledges that the project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations in accordance with Labor Code § 1770 et seq.

ARTICLE 6 – LIQUIDATED DAMAGES. Liquidated damages for the Contractor's failure to complete the Contract within the time fixed for Substantial Completion are established in the amount of **\$ 1,000.00** per calendar day and as further set forth in the Special Conditions.

ARTICLE 7 – CONTRACTOR'S LICENSE. The Contractor must possess throughout the Project the legally-required contractor's license classification for this Project, issued by the State of California, which must be current and in good standing.

[Remainder of Page Intentionally Left Blank]

IN WITNESS WHEREOF, this Agreement has been duly executed by the above-named parties, on the day and year first above written. To the extent that there exists any conflicts or inconsistencies between this Agreement and the General Conditions, the provisions contained in the General Conditions shall govern.

CONTRACTOR:

DISTRICT:

[Insert Contractor Name]

Silver Valley Unified School District

By: _____
[Insert Contractor Name & Title]

By: _____
Associate Superintendent, Business Services

(Corporate Seal)

Approved by Governing Board: _____

[END OF DOCUMENT]

SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's New Gymnasium Project

BID No. 20240270-01

**SECTION 5
PERFORMANCE BOND**

**PERFORMANCE BOND
(CALIFORNIA PUBLIC WORK)**

WHEREAS the **SILVER VALLEY UNIFIED SCHOOL DISTRICT** (also referred to herein "Obligee") has awarded to _____ (hereinafter "Contractor"), a contract for work consisting of but not limited to, furnishing all labor, materials, tools, equipment, services, and incidentals for the **Yermo School's New Gymnasium Project, Bid No. 202140270-01** the "Project");

WHEREAS, the Work to be performed by the Contractor is more particularly set forth in that certain Agreement between the Obligee and Contractor dated _____, which Agreement and all other contract documents set forth therein (collectively, the "Contract Documents") are incorporated herein and made a part hereof by this reference; and

WHEREAS, the Contractor is required by said Contract Documents furnish a bond ensuring the Contractor's prompt, full and faithful performance of the Work under the Contract Documents ("Bond"),

NOW, THEREFORE, we _____, the undersigned Contractor, as Principal, and _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound, along with our respective heirs, executors, administrators, successors and assigns, jointly and severally, unto the **SILVER VALLEY UNIFIED SCHOOL DISTRICT** in the sum of _____ dollars, \$_____, said sum being not less than 100% of the total amount payable by the said Obligee under the terms of the Contract Documents, in lawful money of the United States, as more particularly set forth herein.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal, his or its heirs, executors, administrators, successors or assigns, promptly, fully and faithfully performs 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 Documents, as they may be modified or amended from time to time, and if the Principal indemnifies and saves harmless the Obligee, its officers, agents and employees from any and all losses, liability and damages, claims, judgments, liens, costs, and fees of every description 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 obligations of the Contract Documents, including all modifications and amendments thereto, and any warranties or guarantees required thereunder, as set forth in the Contract Documents, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that no change, adjustment of the Contract Time, adjustment of the Contract Price, alterations, deletions, additions, or any other modifications to the terms of the Contract Documents, the Work to be performed thereunder, or to the Specifications or the Drawings shall limit, restrict or otherwise impair Surety's obligations or Obligee's rights hereunder. Surety hereby waives notice from the Obligee of any such changes, adjustments of Contract Time, adjustments of Contract Price, alterations, deletions, additions or other modifications to the Contract Documents, the Work to be performed under the Contract Documents, or the Drawings or the Specifications.

In the event of the Obligee's termination of the Contract due to the Principal's breach or default of the Contract Documents, within twenty (20) days after written notice from the Obligee to the Surety of the Principal's breach or default of the Contract Documents and Obligee's termination of the Contract, the Surety shall notify Obligee in writing of Surety's assumption of obligations hereunder by its election to either remedy the default or breach of the Principal or to take charge of the Work of the Contract Documents and complete the Work at its own expense ("Notice of Election"); 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, which

approval shall not be unreasonably withheld, limited or restricted. The insolvency of the Principal or the Principal's mere denial of a failure of performance or default under the Contract Documents shall not by itself, without the Surety's prompt, diligent inquiry and investigation of such denial, be justification for Surety's failure to give the Notice of Election or for its failure to promptly remedy the failure of performance or default of the Principal or to complete the Work.

In the event the Surety fails to issue its Notice of Election to Obligee within the time specified herein, the Obligee may take all such action or actions necessary to cure or remedy 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; provided that the Surety's liability hereunder for the costs of performance, damages and other costs sustained by the Obligee upon the Principal's failure of performance under or default under the Contract Documents shall be limited to the penal sum hereof, which shall be deemed to include the costs or value of any Changes of any Work which increases the Contract Price.

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

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.

[Remainder of page intentionally left blank.]

IN WITNESS WHEREOF, we have hereto set our hands and seals this ____ day of _____, 20__.

Principal/Contractor

By: _____
President

Surety

By: _____
Attorney-in-Fact

The rate of premium on this bond is _____ per thousand.

The total amount of premium charged, \$_____.

(The above must be filled in by corporate surety.)

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
)
County of _____)

On this ____ day of _____, in the year _____, before me, _____, a Notary Public in and for said state, personally appeared _____, known to me (or proved to be on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument as the Attorney-in-Fact of the _____ (surety) and acknowledged to me that he subscribed the name of the _____ (surety) thereto and his own name as Attorney-in-Fact.

Notary Public in and for said State

(SEAL)

My Commission expires _____.

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the _____ Secretary of the corporation named as principal to the within bond; that _____ who signed the said bond on behalf of the principal was then _____ of said corporation; that I know his signature, and his signature thereto is genuine; and that said bond was duly signed, sealed and attested for and in behalf of said corporation by authority of its governing Board.

(Corporate Seal)

Signature

Date

NOTE: A copy of the power of attorney to local representatives of the bonding company may be attached hereto.

[This space intentionally left blank.]

IMPORTANT: THIS IS A REQUIRED FORM.

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the Work or Project is financed, in whole or in part, with federal, grant or loan funds, Surety's name must also appear on the Treasury Department's most current list (Circular 570 as amended).

Any claims under this bond may be addressed to:

(Name and Address of Surety)

(Name and Address of agent or representative
for service of process in California)

Telephone: _____

Telephone: _____

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
) ss.
COUNTY OF _____)

On _____, before me, _____, a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

(SEAL)

Notary Public in and for said State

Commission expires: _____

NOTE: A copy of the power-of-attorney to local representatives of the Surety must be attached hereto.

SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's New Gymnasium Project

BID No. 20240270-01

**SECTION 6
PAYMENT BOND**

PAYMENT BOND
(CALIFORNIA PUBLIC WORK)

WHEREAS, the **SILVER VALLEY UNIFIED SCHOOL DISTRICT** (the "Obligee") has awarded to _____ (the "Principal") a contract for the Work commonly described as the: **Yermo School's New Gymnasium Project, Bid No. 20240270-01** (the "Project"); and

WHEREAS, the Work to be performed by the Principal is more particularly set forth in that certain Agreement between the Principal and the Obligee, dated _____, _____ which Agreement and all other contract documents set forth therein (collectively, the "Contract Documents") are incorporated herein and made a part hereof by this reference; and

WHEREAS, by the terms of the Contract Documents, and in accordance with California Civil Code §§ 9550 et seq., 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 on the Project ("Bond"); and

WHEREAS, the term "Claimant" shall refer to any of the persons described in California Civil Code § 9100, who provide or furnish labor, materials or services used or reasonably required for use in the performance of the Work under the Contract Documents, without regard to whether such labor, materials or services were sold, leased or rented.

NOW THEREFORE, 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 Silver Valley Unified School District, as Obligee, for payment of the penal sum of _____ Dollars (\$_____), said sum being not less than one hundred percent (100%) of the total amount payable by the Obligee under the terms of the Contract Documents, in lawful money of the United States, as more particularly set forth herein.

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.

The condition of the obligation is such that if the Principal, or its subcontractors, heirs, executors, administrators, successors or assigns fail to pay (1) any Claimant, (2) amounts due under the Unemployment Insurance Code with respect to Work or labor performed on the Project, or (3) amounts required to be deducted, withheld, and paid to the Employment Development Department from the wages of employees of the Principal and its subcontractors under Section 13020 of the Unemployment Insurance Code with respect to the Work and labor, then Surety will pay for the same in an amount not to exceed the sum specified above and, if an action is brought to enforce the liability on the Bond, the Surety shall pay such reasonable attorneys' fees as fixed by the court, as set forth in Civil Code § 9554.

If the Principal promptly, fully and faithfully makes 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 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)

IMPORTANT: THIS IS A REQUIRED FORM.

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the Work or Project is financed, in whole or in part, with federal, grant or loan funds, Surety's name must also appear on the Treasury Department's most current list (Circular 570 as amended).

Any claims under this bond may be addressed to:

(Name and Address of Surety)

(Name and Address of agent or representative for service for service of process in California)

Telephone: _____

Telephone: _____

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
) ss.
COUNTY OF _____)

On _____, before me, _____, a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Notary Public in and for said State

(SEAL)

Commission expires: _____

NOTE: A copy of the power-of-attorney to local representatives of the Surety must be attached hereto.

SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's New Gymnasium Project

BID No. 20240270-01

**SECTION 7
GENERAL CONDITIONS**

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GENERAL CONDITIONS

Article 1. DEFINITIONS

Addendum: A written change or revision to the Contract Documents issued to the prospective bidders prior to the time of receiving bids.

Alternate: The sum to be added to or deducted from the base Bid if the change in scope of work as described in Alternates is accepted by the District.

Approved: Approved by the District or the District's authorized representative unless otherwise indicated in the Contract Documents.

Architect: The person or firm holding a valid license to practice architecture or engineering which has been designated (if any designated) to provide architectural or engineering design services on this Project. When Architect is referred to within the Contract Documents and no architect or engineer has in fact been designated, then the matter shall be referred to the Director of Facilities or his/her designee.

As Directed: As directed by the District or its Architect, unless otherwise indicated in the Contract Documents.

As Selected: As selected by the District or its Architect, unless otherwise indicated in the Contract Documents.

Bid: The properly completed and signed proposal to perform the construction work for the Project as described in the Contract Documents.

Board of Trustees: The Board of Trustees of the District.

Construction Manager: The individual or entity named as such by the District. If no Construction Manager is designated for the Project, all references to the Construction Manager in these Contract Documents shall mean the District and/or its designee.

Contract: The legally binding agreement between the District and the Contractor wherein the Contractor agrees to furnish the labor, materials, equipment, and appurtenances required to perform the work described in the Contract Documents and the District agrees to pay the Contractor for such work.

Contract Documents: The Contract Documents are described in the Contract for this Project.

Contractor: The person or entity holding a valid license in the State of California required for performing this Project and who has contracted with the District to perform the construction work described in the Contract Documents. The term Contractor shall be construed to mean all of the officers, employees, Subcontractors, suppliers, or other persons engaged by the Contractor for the work of this Project.

Day: As used herein shall mean calendar day unless otherwise specifically designated.

District and/or Owner: The District, its Board of Trustees, authorized officers and employees, and authorized representatives.

DSA: The State of California Division of the State Architect which has the authority to review, approve and inspect the design, alteration and construction of school buildings.

Final Completion: Final Completion is achieved when the Contractor has fully completed all Contract Document requirements, including, but not limited to, all final punch list items, to the District's satisfaction.

Furnish: Purchase and deliver to the site of installation.

Improvements: The buildings, structures and/or sites that will be constructed, renovated and/or remodeled as part of the Project.

Indicated or As Shown: Shown on drawings and/or as specified.

Inspector: The person engaged by the District to conduct the inspections required by the Education Code and Title 24.

Install: Fix in place, for materials; and fix in place and connect, for equipment.

Modification: An authorized change to the Contract Documents which may or may not include a change in contract price and/or time.

Perform: The Contractor, at Contractor's expense, shall perform all operations necessary to complete the work, including furnishing of necessary labor, tools, and equipment, and further including the furnishing and installing of materials that are indicated, specified, or required to complete such performance.

Project: The total construction work and activities described in these Contract Documents.

Secure: Obtain.

Subcontractor: A person, firm, or corporation, duly licensed by the State of California, who has a contract with the Contractor to furnish labor, materials and equipment, and/or to install materials and equipment for work in this Contract.

Substantial Completion: Substantial Completion is achieved when the District has the occupation, beneficial use, and enjoyment of the improvement, excluding any final punch list items to be performed by the Contractor at District's direction.

Surety: The person, firm, or corporation, admitted as a California admitted surety that executes as surety the Contractor's Performance Bond and Payment Bond for Public Works.

Work: "Work" of the Contractor or subcontractor includes labor or materials or both.

Miscellaneous terms and phrases:

Where the words "equal," "equivalent," "satisfactory," "directed," "designated," "selected," "as required," and words of similar meaning are used, the written approval, selection, satisfaction, direction, or similar action of the District is required.

Where the word "required" and words of similar meaning are used, it shall mean, "as required to properly complete the work as required by the District," unless stated otherwise.

Where the words "acceptable," "acceptance," or words of similar import are used, it shall be understood that the acceptance of the District is intended.

Article 2. ARCHITECT

The Architect is responsible for the overall design of the Project. The working drawings, technical Specifications, sketches and other information necessary to define the work covered by these Contract Documents have been prepared by the Architect. The Architect shall visit, inspect, and observe the construction to determine general compliance with the Contract Documents, and interpret the drawings and Specifications consistent with their intent. The Architect shall evaluate the samples and other submittals required in the technical Specifications, and maintain an up-to-date log of all such items processed. The Architect will consult with the District, Contractor, and any state, county or city agency having jurisdiction over the work whenever necessary to further the best interests of the Project. The Architect will assist the District in reviewing and preparing Change Orders. The Architect will conduct observations to determine the date(s) of interim milestones, if any, and the dates of Substantial Completion 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.

Article 3. DRAWINGS AND SPECIFICATIONS

- a. **Contract Documents.** The Contract Documents consist of the executed Contract and all Addenda, all approved change orders, the completed Bid Form, the required Bonds and the Insurance forms, the Notice to Bidders, the Instructions to Bidders, the Notice of Intent to Award, the Notice to Proceed, the General Conditions, the Special Conditions, the drawings and Specifications. Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. The intention of documents is to include all labor and materials, equipment, and transportation necessary for the proper execution of the work. Materials or work described in words which as applied have a well-known technical or trade meaning shall be deemed to refer to such recognized standards.

- b. **Interpretations.** Drawings and specifications are intended to be fully cooperative and to agree. However, if Contractor observes that drawings and specifications are in conflict, he or she shall promptly notify the District in writing and any necessary changes shall be adjusted as provided in the Contract for changes in work. If such conflict arises, the following order of precedence shall generally apply, provided, however, that the order of precedence shall not be so rigidly interpreted as to affect an absurd or costly result:
 - 1. Special Conditions shall take precedence over General Conditions.
 - 2. Technical Specifications implement, in additional detail, the requirements of the General Conditions. In the event of conflict between the Technical Specifications and the General Conditions, the General Conditions shall take precedence.
 - 3. In the event of a conflict between the Technical Specifications and the drawings, the higher quality, higher quantity and most stringent requirements shall be deemed to apply and shall govern as to materials, workmanship, and installation procedures.
 - 4. With regard to drawings:
 - (a) Figures govern over scaled dimensions;
 - (b) Larger details govern over general drawings;
 - (c) Addenda/change order drawings govern over contract drawings;
 - (d) Contract drawings govern over standard drawings.
 - 5. Work not particularly shown or specified shall be the same as similar parts that are shown or specified.

- c. **Ambiguities, Errors and Inconsistencies.** If, in the opinion of the Contractor, the construction details indicated on the drawings or otherwise specified are in conflict with accepted industry standards for quality construction and therefore might interfere with its full guarantee of the work involved, the Contractor shall promptly bring this information to the attention of the Architect for appropriate action before submittal of the bid. Contractor's failure to request clarification or interpretation of an apparent ambiguity, error or inconsistency waives that Contractor's right to thereafter claim any entitlement to additional compensation based upon an ambiguity, inconsistency, or error, which should have been discovered by a reasonably prudent Contractor, subject to the limitations of Public Contract Code §1104. During the Project, should any discrepancy appear or any misunderstanding arise as to the import of anything contained in the Contract Documents, the matter shall be promptly referred to the Architect (with written notice to the District's Construction Manager), who will issue instructions or corrections. Misunderstanding of drawings and specifications shall be clarified by the District, whose decisions shall be final.
- d. **Lines and Planes.** All lines and planes appearing on Contract drawings to be horizontal or vertical and not explicitly indicated otherwise shall be constructed true and plumb. All lines and planes appearing on Contract drawings to intersect at right angles and not explicitly indicated otherwise shall be constructed at true right angles. Where details are indicated covering specific conditions, such details also apply to all similar conditions not specifically indicated.
- e. **Standards.** Standards, Rules, and Regulations referred to are recognized printed standards and shall be considered as one and a part of these specifications within limits specified. The specification standards of the various sections of the Specifications shall be the procedural, performance, and material standards of the applicable association publications identified and shall be the required level of installation, materials, workmanship, and performance for the applicable work. Except where a specific date of issue is mentioned hereinafter, references to specification standards shall mean the edition, including amendments and supplements, in effect on the date of the Notice to Bidders. Where no standard is identified and a manufacturer is specified, the manufacturer's specifications are the standards. All standards shall be subordinate to the requirements of the applicable codes and regulations.
- f. **Reference to the Singular.** Wherever in the Specifications an article, device or piece of equipment is referred to in the singular number, such reference shall include as many such items as are shown on drawings or required to complete the installation.
- g. **Intent of Drawings and Specifications.** It is the intent of the drawings and Specifications to show and describe complete installations. Items shown but not specified, or specified but not shown, shall be included unless specifically omitted.
 - 1. The Specifications shall be deemed to include and require everything necessary and reasonably incidental to the completion of all work described and indicated on the drawings, whether particularly mentioned or shown, or not.
 - 2. Figured dimensions shall be followed in preference to scaled dimensions, and the Contractor shall make all additional measurements necessary for the work and shall be responsible for their accuracy. Before ordering any material or doing any work, the Contractor shall verify all measurements at the Project site and shall be responsible for the correctness of same.

Article 4. TRADE DIVISIONS

Segregation of the Specifications into the designated trade divisions is only for the purpose of facilitating descriptions and shall not be considered as limiting the work of any subcontract or trade. Subject to other

necessary provisions set forth in the Specifications, the terms and conditions of such limitations or inclusions shall lie solely between the Contractor and its Subcontractors. "Scope" as indicated in each section of the Specifications shall serve only as a general guide to what is included in that section. Neither the stated description nor the division of the plans and Specifications to various sections, which is done solely for convenience, shall be deemed to limit the work required, divide or indicate it by labor jurisdiction or trade practice, or set up any bidding barriers to the various sub-contractors or suppliers.

- a. The Contractor shall be responsible for the proper execution of all work required by the Contract Documents and for allocating such portions as the Contractor sees fit to the various Subcontractors, subject to applicable law. The Contractor is cautioned that the various individual sections may not contain all work that the Contractor may wish to allocate to a particular Subcontractor or everything bearing on the work of a particular trade, some of which may appear in other portions of the plans or Specifications.
- b. If the Contractor elects to enter into any subcontract for any section of the work the Contractor assumes all responsibility for ascertaining that the Subcontractor for the work is competent, licensed, solvent, thoroughly acquainted with all conditions and legal requirements of the work, has included all materials and appurtenances in connection therewith in the subcontract, and has performed its work in strict compliance with the Contract Documents.
- c. It shall be the responsibility of the Contractor to notify each prospective Subcontractor at the time of request for bids of all portions of the Contract Documents, including the General Conditions, special conditions and any parts of sections of Specifications or plans that the Contractor intends to include as part of the subcontract.

Article 5. MASTER MANDATORY PROVISIONS

- a. Any material, item, or piece of equipment mentioned, listed or indicated without definition of quality, shall be consistent with the quality of adjacent or related materials, items, or pieces of equipment on the Project.
- b. Any method of installation, finish, or workmanship of an operation called for, without definition of standard of workmanship, shall be followed or performed and finished in accordance with best practices and consistent with adjacent or related installations on the Project.
- c. Any necessary material, item, piece of equipment or operation not called for but reasonably implied as necessary for proper completion of the work shall be furnished, installed or performed and finished; and shall be consistent with adjacent or related materials, items, or pieces of equipment on the Project, and in accordance with best practices.
- d. Names or numbered products are to be used according to the manufacturers' directions or recommendations unless otherwise specified.

Article 6. COPIES FURNISHED

Contractor will be furnished, free of charge, digital copies of drawings and specifications as set forth in Special Conditions. Contractor responsible for printing.

Article 7. OWNERSHIP OF DRAWINGS

All drawings, specifications, and copies thereof furnished by District are its property. They are not to be used on other work and with exception of signed contract sets, are to be returned to District on request at completion of work.

Article 8. DETAIL DRAWINGS AND INSTRUCTIONS

- a. **Examination of Contract Documents.** Before commencing any portion of the Work, Contractor shall again carefully examine all applicable Contract Documents, the Project site and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall immediately notify the District Representative of any potential error, inconsistency, ambiguity, conflict or lack of detail or explanation. If Contractor performs, permits, or causes the performance of any Work which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all resulting costs, including, without limitation, the cost of correction. In no case shall the Contractor or any subcontractor proceed with Work if uncertain as to the applicable requirements.
- b. **Additional Instructions.** After notification of any error, inconsistency, ambiguity, conflict or lack of detail or explanation, the District Representative will provide any required additional instructions, by means of drawings or other written direction, necessary for proper execution of the Work.
- c. **Quality of Parts, Construction and Finish.** All parts of the Work shall be of the best quality of their respective kinds and the Contractor must use all diligence to inform itself fully as to the required construction and finish. In no case shall Contractor proceed with the Work without obtaining first from the District Representative such approval as may be necessary for the proper performance of Work.
- d. **Contractor's Variation from Contract Document Requirements.** If it is found that the Contractor has varied from the requirements of the Contract Documents including the requirement to comply with all applicable laws, ordinances, rules and regulations, including all rules, policies, and regulations of the Silver Valley Unified School District Board of Trustees, including any rules and regulations related to COVID-19 or other global pandemics, and all federal, state, and local laws, ordinances and regulations, are to be observed strictly by Contractor during the performance of Services pursuant to this Agreement. the District Representative may at any time, before or after completion of the Work, order the improper Work removed, remade or replaced by the Contractor at the Contractor's expense.

Article 9. CONTRACTOR

- a. Quality of Work: The Contractor shall perform all the work and activities required by the Contract Documents and furnish all labor, materials, equipment, tools and appurtenances necessary to perform the work and complete it to the District's satisfaction within the time specified. The Contractor shall at all times perform the work of this Contract in a competent and workmanlike manner and, if not specifically stated, accomplish the work according to the best standards of construction practice. The Contractor in no way is relieved of any responsibility by the activities of the architect, engineer, inspector or DSA in the performance of such duties.
- b. Full-Time Superintendent: The Contractor shall employ a full-time competent superintendent and necessary assistants who shall have complete authority to act for the Contractor on all matters pertaining to the work. The superintendent shall be satisfactory to the District and, if not satisfactory, shall be replaced by the Contractor with one that is acceptable. Also, the superintendent shall not be changed without the written consent of the District unless the superintendent ceases to be employed by the Contractor.
- c. Field Measurements: Contractor shall make the layout of lines and elevations and shall be responsible for the accuracy of both the Contractor's and the Subcontractors' work resulting therefrom. All dimensions affecting proper fabrication and installation of all Contract work must

be verified by the Contractor prior to fabrication and installation by taking field measurements of the true conditions. The Contractor shall take, and assist Subcontractors in taking, all field dimensions required in performance of the work, and shall verify all dimensions and conditions on the site. If there are any discrepancies between dimensions in drawings and existing conditions which will affect the work, the Contractor shall promptly bring such discrepancies to the attention of the Architect for adjustment before proceeding with the work. Contractor shall be responsible for the proper fitting of all work and for the coordination of all trades, Subcontractors and persons engaged upon this Contract.

- d. Contractor shall do all cutting, fitting, or patching of Contractor's work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors as shown, or reasonably implied by, the drawings and Specifications for the completed work. Any cost incurred by the District due to defective or ill-timed work shall be borne by the Contractor.

Article 10. RESPONSIBILITY OF CONTRACTOR

- a. Contractor shall be held strictly responsible for the proper performance of all work covered by the Contract Documents, including all work performed by Subcontractors. All work performed under this Contract shall comply in every respect to the rules and regulations of all agencies having jurisdiction over the Project or any part thereof.
- b. Contractor shall submit Verified Reports as defined in 24 California Code of Regulations ("CCR") §§ 4-336 and 4-343(c). The duties of the Contractor are as defined in 24 CCR § 4-343. Contractor shall keep and make available a copy of Title 24 of the CCR at the job site at all times.
- c. Where any item of fabricated materials and/or equipment, indicated on drawings or specified is unobtainable and it becomes necessary, with the consent of the Architect and District, to substitute equivalent items differing in details or design, the Contractor shall promptly submit complete drawings and details indicating the necessary modifications of the work. To the extent the items represent a lower cost to contractor than what was originally specified, District shall be entitled to a corresponding decrease in the contract price. This provision shall be governed by the terms of the General Conditions regarding Submittals: Shop Drawings, Cuts and Samples.
- d. With respect to work performed at or near a school site, Contractor shall at all times take all appropriate measures to ensure the security and safety of students and staff, including, but not limited to, ensuring that all of Contractor's employees, Subcontractors, and suppliers entering school property strictly adhere to all applicable District policies and procedures, e.g., sign-in requirements, visitor badges, and access limitations.
- e. Prohibition on Harassment.
 - 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.
 - 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 preventing harassment among its employees, expressing strong disapproval of any form of harassment, developing appropriate sanctions for harassment, 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 all Subcontractors and Sub-subcontractors performing any portion of the Work to adopt and implement policies in conformity with this Article.

- 3) 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 10.e.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, 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 10.e.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.

Article 11. SUBCONTRACTORS & SUBCONTRACTING

- a. Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the District. The District shall be deemed to be the third party beneficiary of the contract between the Contractor and each Subcontractor. If the Contractor does not specify a Subcontractor for any portion of the work to be performed under this Contract, as required by law, Contractor shall perform that portion of the work with its own forces. The Contractor shall not substitute any other person or firm as a Subcontractor for those listed in the

bid submitted by the Contractor, without the written approval of the District and in conformance with the requirements of the Public Contract Code, including but not limited to sections 4100, et seq. The District reserves the right of approval of all Subcontractors proposed for use on this Project, and to this end, may require financial, performance, and such additional information as is needed to secure this approval. If a Subcontractor is not approved, the Contractor shall promptly submit another firm of the same trade for approval.

- b. The Contractor shall insert appropriate provisions in all subcontracts pertaining to work on this Project requiring the Subcontractors to be bound by all applicable terms of the Contract Documents. The Contractor shall be as fully responsible for the acts and omissions of the Subcontractors, and of persons either directly or indirectly employed by them, as the Contractor is for the acts and omissions of persons directly employed by the Contractor.
- c. Substitution or addition of subcontractors shall be permitted only as authorized in California Public Contract Code Sections 4100 et seq.

Article 12. CONFERENCES AND MEETINGS

- a. A material obligation of the Contractor under the Contract Documents is the attendance at required meetings by the Contractor's supervisory personnel for the Work. 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.
- b. Pre-Construction Conference: The Contractor's representatives and those representatives of the 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 generally address the requirements of the Work and Contract Documents, and to establish construction procedures.
- c. Progress Meetings: Progress Meetings will be conducted on regular intervals (weekly unless otherwise agreed to by the Parties). The Contractor's representatives will attend the meeting, which shall be chaired by the Construction Manager or Architect, as designated. Contractor shall submit all Change Order Requests for initial review by the District at the Progress Meeting.
- d. Meeting Minutes: The Architect or Construction Manager will prepare and distribute minutes reflecting the items addressed and actions taken at a meeting or conference.

Article 13. REQUESTS FOR INFORMATION

- a. Any Requests for Information ("RFI") shall reference all applicable Contract Document(s), including Specification Section, detail(s), page number(s), drawing numbers(s) and sheet number(s), etc. The Contractor shall make suggestions and interpretations of the issues raised by each Request for Information. By itself, an RFI cannot modify Project price, scheduled completion date or the Contract Documents.
- b. Contents of RFI: If the Contractor encounters any condition which the Contractor believes, in good faith and with reasonable basis, is the result of an ambiguity, conflict, error or omission in the Contract Documents (collectively "the Conditions"), it shall be the affirmative obligation of the Contractor to timely notify the District, in writing, of the Conditions encountered and to request information from the District necessary to address and resolve any such Conditions before proceeding with any portion of the Work affected or which may be affected by such Conditions. If the Contractor fails to timely notify the District in writing of any Conditions encountered and the Contractor proceeds to perform any portion of the Work containing or affected by such

Conditions, the Contractor shall bear all costs associated with or required to correct, remove, or otherwise remedy any portion of the Work affected thereby without adjustment of the Contract Time or the Contract Price. The Contract Time shall not be subject to adjustment in the event that the Contractor fails to timely request information from the Architect. The Architect's responses to any such Contractor request for information shall be provided within five (5) days. The foregoing provisions notwithstanding, in the event that the Architect reasonably determines that any of Contractor's request(s) for information: (i) does not reflect adequate or competent supervision or coordination by the Contractor or any Subcontractor; or (ii) does not reflect the Contractor's adequate or competent knowledge of the requirements of the Work or the Contract Documents; or (iii) is not justified for any other reason, Contractor shall be liable to the District for all costs incurred by the District associated with the processing, reviewing, evaluating and responding to any such request for information, including without limitation, fees of the Architect and any other design consultant to the Architect or the District.

- c. Unnecessary RFIs: The Contractor may be responsible for any costs incurred for professional services the District may deduct from any amounts owing to the Contractor, if any RFI requests an interpretation or decision of a matter where the information is equally available to the party making the request.

Article 14. SAFETY/PROTECTION OF PERSONS AND PROPERTY

- a. Contractor will be solely and completely responsible for conditions of the Work Site, including safety of all persons and property during the performance of the Work. This will apply continuously and not be limited to normal working hours. The wearing of hard hats will be mandatory at all times for all personnel on Site. Contractor shall supply sufficient hard hats to properly equip all employees and visitors.
- b. The Contractor shall furnish to the District a copy of the Contractor's safety plan within thirty (30) after the issuance of the Notice to Proceed. Contractor shall designate a responsible member of the company to post information regarding protection and obligations of workers, to comply with reporting and other occupational safety requirements. Contractor shall correct any violations of safety laws, rules, orders, standards, or regulations. Upon the issuance of a citation or notice of violation by the Division of Occupational Safety and Health Administration, Contractor shall correct such violation promptly. Upon notice from the District of a safety or health complaint from the surrounding community, Contractor shall work with the District to address the complaint, including where applicable, modifying the schedule and/or the manner of work to avoid undue disruption or safety risks to the community.

Article 15. PERFORMANCE AND PAYMENT BONDS

- a. Contractor shall file with the District the following bonds, using the bond forms provided with these Contract Documents:
 - 1) A corporate surety bond, in a sum not less than 100 percent of the amount of the Contract, to guarantee the faithful performance of the Contract.
 - 2) A corporate surety bond, in a sum not less than 100 percent of the amount of the Contract, to guarantee the payment of wages for services engaged and of bills contracted for materials, supplies, and equipment used in the performance of the Contract.
- b. Corporate sureties on these bonds and on bonds accompanying bids must be admitted sureties as defined by law, legally authorized to engage in the business of furnishing surety bonds in the State of California. All sureties and bond forms must be satisfactory to the District. Failure to

submit the required bonds within the time specified by the Notice of Intent to Award, using the forms provided by the District, may result in cancellation of the award of Contract and forfeiture of the Bid Bond.

- c. The amount of the Contract, as used to determine the amounts of the bonds, shall be the total amount fixed in the Contractor's proposal for the performance of the required work.
- d. During the period covered by the Contract, if any of the sureties upon the bonds shall become insolvent or unable, in the opinion of the District, to pay promptly the amount of such bonds to the extent to which surety might be liable, the Contractor, within thirty (30) days after notice given by the District to the Contractor, shall provide supplemental bonds or otherwise substitute another and sufficient surety approved by the District in place of the surety becoming insolvent or unable to pay. If the Contractor fails within such thirty (30) day period to substitute another and sufficient surety, the Contractor shall, if the District so elects, be deemed to be in default in the performance of its obligations hereunder and upon the bid bond, and the District, in addition to any and all other remedies, may terminate the Contract or bring any proper suit or other proceedings against the Contractor and the sureties or any of them, or may deduct from any monies then due or which thereafter may become due to the Contractor under the Contract, the amount for which the surety, insolvent or unable to pay, shall have been liable on the bonds, and the monies so deducted shall be held by the District as collateral security for the performance of the conditions of the bonds.

Article 16. TIME

- a. The Contractor shall commence the work on the date indicated in the Notice to Proceed. Time is of the essence regarding the Contract work, and the Contractor shall prosecute the work diligently and regularly at such a rate of progress as to ensure completion of this Project within, or sooner than, the time specified.
- b. The Contractors and Subcontractors shall investigate and become aware of the amount of time required for the delivery of all equipment and materials required to perform the work under this Contract, and no extension of time shall be granted due to failure to order the equipment and materials sufficiently before their incorporation into the work so as to avoid delay to the Project.
- c. The Contractor and Subcontractors shall provide and maintain enough manpower, materials and equipment to ensure a rate of construction progress that will complete the Project within or sooner than the time specified and according to the schedule of work. If, in the District's opinion, the Contractor and/or Subcontractors are not prosecuting the work at a sufficient rate of progress to meet the Project schedule, the District may direct the Contractor to provide additional manpower, materials or equipment, or to work additional hours, holidays or weekends without additional cost to the District until the work is progressing in a manner satisfactory to the District. Failure to prosecute the work in a timely manner according to the Project schedule is considered a breach of Contract and shall be cause for termination of the Contract.

Article 17. CONSTRUCTION SCHEDULE

- a. Within fifteen (15) calendar days after the award of the Contract, the Contractor shall prepare and submit to the Architect and District an as-planned construction schedule showing in detail how the Contractor plans to prosecute the work within the time set for Final Completion, also referred to as the "Baseline Construction Schedule." The schedule shall include the work of all trades necessary for construction of the Project, and shall be sufficiently complete and comprehensive to enable progress to be monitored on a day-by-day basis. The information for each activity shall include at a minimum the activity description, duration, start date and completion date. The first

payment will not be made unless the District has been provided and has accepted the project schedule.

- b. The Contractor shall take care in the preparation of the schedule to ensure that it represents an accurate and efficient plan for accomplishing the work. If the Project is more than one week behind schedule, it must be promptly revised showing how the Contractor plans to complete the work, but in no case shall it show a completion date later than that required by the Contract, unless a time extension has been granted. The current schedule shall be kept posted in the Contractor's project office on site. All required schedules shall be periodically updated to reflect changes in the status of the job, including weather delays. At a minimum, the Contractor shall be required to provide and keep updated a monthly schedule in order to prevent delay claims. Contractor shall, at the request of the District, prepare a recovery schedule when Contractor's Work has fallen behind schedule.
- c. The Contractor shall be responsible for the coordination of all work necessary and pertaining to the construction whether actually a part of this Contract or attendant thereto. The Contractor shall notify the District and various utility companies, as far as possible in advance of their required work, in order that work schedules may be developed for all concerned, which will permit the most effective and timely accomplishment of the entire Project.

Article 18. DELAYS AND TIME EXTENSIONS

- a. Excusable Delays. If Final Completion of the Work is delayed by Excusable Delays, the Contract Time shall be subject to adjustment for such reasonable period of time as determined by the District. Excusable Delays shall not result in any increase in the Contract Price. "Excusable Delays" refer to unforeseeable and unavoidable casualties or other unforeseen causes beyond the control, and without fault or neglect, of the Contractor, any Subcontractor, Material Supplier or other person directly or indirectly engaged by the Contractor in performance of any portion of the Work. Excusable Delays include unanticipated and unavoidable labor disputes, unusual and unanticipated delays in transportation of materials or construction equipment reasonably necessary for completion and proper execution of the Work, acts of the public enemy, acts of another contractor in the performance of another contract with the District, priority of a governmental agency for materials or equipment, fire, flood, violent wind storm, pandemic, epidemic, quarantine restriction, strike, freight embargo, or weather of an unusually severe nature. 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 Baseline Construction Schedule or the most recent updated Baseline Construction Schedule relative to the date(s) of the claimed event(s) of Excusable Delay. The foregoing provisions notwithstanding, if the Supplemental 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 Supplemental Conditions and such additional rain days shall have directly and adversely impacted the progress of the Work as depicted in the Baseline

Construction Schedule or the most recent updated Baseline Construction Schedule relative to the date(s) of such additional rain days. The Contractor will not be granted time extensions for weather conditions which are normal for the location of the Project, according to the U. S. Weather Bureau Records.

- b. Time Extension. A request for extension of time and compensation related thereto shall be made in writing to the Architect and District within ten (10) calendar days of the date the delay is encountered, or shall be deemed waived. In addition the requirements set forth in Article 18.a. above, the request shall include a detailed description of the reasons for the delay and corrective measures by the Contractor. The request shall be accompanied by evidence that the insurance policies required by the Contract shall be in effect during the requested additional period of time. In order for the Architect to consider a request for time extension, the Contractor must prove that the reasons stated for the delay actually caused a delay in portions of the work which will result in completion beyond the date specified in the Contract. The Contractor may also be granted a time extension for a significant change in the scope of work which request for extension of time shall be included in a Contract modification proposal.
- c. Compensable Delays. No damages or compensation or any kind shall be paid to a Contractor because of delays in the progress of work, whether such delays be avoidable or unavoidable, that are not the responsibility of District. District's liability to Contractor for delays for which District is responsible shall be limited to an extension of time unless such delays were unreasonable under the circumstances involved and were not within the contemplation of the parties when the Contract was awarded. The Contractor shall only be entitled to the actual, substantiated costs incurred by Contractor for which the Contractor may claim damages from District. Contractor shall provide written documentation to the District to support such actual, substantiated costs incurred. Such costs, if any, shall be directly related to the Project, and shall not include costs that would be borne by the Contractor in the regular course of business, including, but not limited to, home office overhead and ongoing insurance costs. Delay damages shall not include Contractor or Subcontractor markup for overhead and profit, but only actual, documented, and direct actual costs. The District shall not be liable for any damages which the Contractor could have avoided by any reasonable means including, but not limited to, the more judicious handling of forces or equipment.
- d. The granting of an extension of time because of unavoidable delays shall in no way operate as a waiver on the part of the District of the right to collect liquidated damages for other delays or of any other rights to which the District is entitled.

Article 19. LIQUIDATED DAMAGES

- a. The parties understand and agree that the goodwill, educational process, and other business of District will be damaged if the Project is not completed and the Improvements cannot be occupied by the date of the stated Project completion. The parties have further agreed that the exact amount of damages for failure to complete the Work within the time specified is, in some cases, extremely difficult, impractical, or impossible to determine. As to those damages that are difficult, impractical, or impossible to determine, should the Contractor fail to achieve Substantial Completion of this Contract within the time fixed for Substantial Completion, together with extensions granted by the District for unavoidable delays, Contractor shall become liable to the District in the amount specified in the Contract per calendar day for each day the Contract remains incomplete beyond the time for Substantial Completion, as liquidated damages and not as a penalty. Contractor shall not be charged with liquidated damages when the delay in completion of the work beyond the time for Substantial Completion is due to acts of the District. These liquidated damages will compensate the District for its delay damages, loss of use and the inability to occupy or otherwise utilize the Improvements. The District may, without waiving any of its

rights, assess liquidated damages after Substantial Completion of the Project.

- b. In addition to any liquidated damages which may be assessed, if Contractor fails to achieve Substantial Completion of this Contract within the time fixed for Substantial Completion, together with extensions granted by the District for unavoidable delays, and if as a result District finds it necessary to incur any costs and/or expenses in addition to cost directly related to delays, or if District receives any claims by other contractors, subcontractors, or third parties claiming time or other compensation by reason of Contractor's failure to complete work on time, Contractor shall pay all those costs and expenses incurred by District.
- c. Any money due or to become due to the Contractor may be retained to cover liquidated and other damages. Should such money not be sufficient to cover those damages, the District shall have the right to recover the balance from the Contractor or Contractor's sureties.
- d. Should the District authorize suspension of the work for any cause, the time work is suspended will be added to the time for completion. Suspension of the work by the District shall not be a waiver of the right to claim liquidated or other damages as set forth in this section.

Article 20. ASSIGNMENT

Contractor shall not assign this Contract or any part thereof without prior written consent of District. Any assignment of money due or to become due under this Contract shall be subject to a prior lien for services rendered or material supplied for performance of the Work called for under said Contract in favor of all persons, firms, or corporations rendering such services or supplying such materials to the extent that claims are filed pursuant to the Civil Code, the Code of Civil Procedure, and/or the Government Code. If Contractor attempts to make such an assignment without such consent, Contractor shall nevertheless remain legally responsible for all obligations under the Contract.

Article 21. PROHIBITED INTERESTS

No official of the District and no District representative who is authorized in such capacity and on behalf of the District to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting or approving any engineering, inspection, construction or material supply contract or any subcontract in connection with construction of the Project, shall be or become directly or indirectly interested financially in this Contract or in any part thereof. No officer, employee, attorney, engineer or inspector of or for the District who is authorized in such capacity and on behalf of the District to exercise any executive, supervisory or other similar functions in connection with construction of the Project, shall become directly or indirectly interested financially in this Contract or in any part thereof.

Article 22. SEPARATE CONTRACTS

District reserves the right to let other contracts in connection with this Work or other work at the same site. Contractor shall afford other contractors reasonable opportunity for introduction and storage of their materials and execution of their work and shall properly connect and coordinate his Work with theirs.

If any part of Contractor's Work depends for proper execution or results upon work of any other contractor, the Contractor shall inspect and promptly report to District any defects in such work that renders it unsuitable for such proper execution and results. His failure to inspect and report shall constitute his acceptance of other contractor's work as fit and proper for reception of his Work, except as to defects which may develop in the other contractor's work after execution of Contractor's Work.

To ensure proper execution of his subsequent work, Contractor shall measure and inspect work already in place and shall at once report to the District any discrepancy between executed work and the Contract

Documents.

Contractor shall ascertain to his own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by District in prosecution of the Project to the end that Contractor may perform this Contract in the light of such other contracts, if any. Nothing herein contained shall be interpreted as granting to Contractor exclusive occupancy at the Project site. Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on project. If simultaneous execution of any contract for the Project is likely to cause interference with performance of some other contract or contracts, District shall decide which contractor shall cease work temporarily and which contractor shall continue or whether work can be coordinated so that contractors may proceed simultaneously. District shall not be responsible for any damages suffered or for extra costs incurred by Contractor resulting directly or indirectly from award, performance, or attempted performance of any other contract or contracts on the Project, or caused by any decision or omission of District respecting the order of precedence in performance of contracts.

Article 23. COORDINATION WITH OTHER CONTRACTS

- a. The District reserves the right to do other work or award other contracts in connection with this Project. By entering into this Contract, Contractor acknowledges that there may be other contractors on or adjacent to the Project site whose work must be coordinated with that of its own. Contractor expressly warrants and agrees that it will cooperate with other contractors and will do nothing to delay, hinder, or interfere with the work of other contractors, or that of the District, its Architect and Construction Manager. Contractor also expressly agrees that in the event its work is hindered, delayed, interfered with, or otherwise affected by a separate contractor, its sole remedy will be a direct action against the separate contractor. To the extent allowed by law, the Contractor expressly waives any remedy against the District, its Architect and Construction Manager on account of delay, hindrance, interference or other such events caused by a separate contractor.
- b. If any part of Contractor's work depends upon the work of a separate contractor, Contractor shall inspect such other work and promptly report in writing to the District and Architect any defects in such other work that render it unsuitable to receive the work of Contractor. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's work, except as to defects which the Contractor could not have detected through the reasonable inspection of the other contractor's work prior to the execution of Contractor's work.
- c. If Contractor is aware of a current or potential conflict between Contractor's work and the work of another contractor on the site, and is unable to informally resolve the conflict directly with the other contractor, Contractor shall promptly provide written notice to the District, with a copy to the Architect and the other contractor, specifying the nature of the conflict, the date upon which the conflict arose, and the steps taken to attempt to resolve the conflict. The District may issue written instructions to address the conflict.

If, through Contractor's negligence, any other contractor or subcontractor shall suffer loss or damage to the work, Contractor shall make a reasonable effort to settle with such other contractor and subcontractor by agreement or arbitration. If such other contractor or subcontractor shall assert any claim against the District or Architect, on account of any damage alleged to have been so sustained, the District or Architect shall notify the Contractor, who shall defend such proceedings at Contractor's own expense and save harmless and indemnify the District and the Architect from any such claim.

Article 24. DISTRICT'S RIGHT TO STOP WORK; TERMINATION OR SUSPENSION OF THE CONTRACT

a. District's Right to Stop Work:

In addition to or as an alternative to any and all other remedies available to the District, if the Contractor fails to correct work which is not performed in accordance with the Contract Documents, or if the Contractor persistently fails to perform the work in accordance with 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 order has been eliminated to the satisfaction of the District. However, the right of the District to stop the work shall not give rise to a duty on the part of the District to exercise this right for the benefit of the Contractor or any other person or entity, and the failure of the District to do so shall not be raised as a defense to the Contractor's failure to perform the work in accordance with the Contract Documents.

b. Termination for Cause:

- 1) If the Contractor refuses or fails to furnish sufficient materials, work force, equipment, and appurtenances to properly prosecute the work in a timely manner, or if Contractor refuses or fails to comply with any provisions of the Contract Documents, or if Contractor should file a bankruptcy petition or make a general assignment for the benefit of Contractor's creditors or if a receiver should be appointed on account of Contractor's insolvency, then the District may give the Contractor and Contractor's Surety written notice of intention to terminate the Contract. Unless within seven (7) calendar days after the serving of such notice upon the Contractor and Contractor's Surety such violation shall cease and arrangements for correction of such conditions shall be made satisfactory to the District, the Contract shall cease and terminate. In the event of such termination, the District shall immediately serve written notice thereof upon the Contractor and Contractor's Surety.
- 2) In the event of termination for cause, in addition to all remedies available to the District, the Contractor's Surety shall have the right to take over and perform the Contract; provided, however, that if the Surety does not commence performance within five (5) calendar days from the date of the issuance of such notice of termination, the District may take over the work and prosecute the same to completion by letting another Contract, or by any other method that the District deems advisable. The Contractor and Contractor's Surety shall be liable for any excess cost incurred by the District thereby, and in any such event the District may take possession of such materials, equipment, and other property belonging to the Contractor as may be on the site and use same in completing the work.

c. Termination or Suspension for Convenience:

The District reserves the right, in its sole discretion, to terminate or suspend all or part of the Contract for convenience following seven (7) days written notice to the Contractor. In the event of termination or suspension for convenience, Contractor shall have no claims against the District, except:

- 1) The actual cost of labor, materials and services provided pursuant to the Contract, and which have not yet been paid for, as documented by timesheets, invoices, receipts and the like; and
- 2) Five percent (5%) of the total cost of the work performed as of the date of notice of termination or suspension or five percent (5%) of the value of the work yet to be completed, whichever is less. The parties agree that this amount shall constitute full and fair compensation for all Contractor's lost profits and other damages resulting from the termination or suspension for convenience.

Article 25. GUARANTEE

Contractor warrants to the District that material and equipment furnished under the Contract will be of the highest quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty does not cover damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the District, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. So long as District forwards written notification of any warranty item to Contractor within the warranty period, Contractor's obligation to correct the warranty item continues until the correction is made. As stated in the Project Warranty form, the warranty period is at least two years. In the event of failure of the Contractor to repair a defect within seven (7) days after being notified in writing, the District is hereby authorized to proceed to have defects repaired and made good at expense of the Contractor who shall pay costs and charges therefore immediately on demand.

If, in the opinion of the District, defective work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the District or to prevent interruption of operations of the District, the District will attempt to give the notice required by this article. If the Contractor cannot be contacted or does not comply with the District's request for correction within a reasonable time as determined by the District, the District may, notwithstanding the provisions of this article, proceed to make such correction or provide such attention. The costs of such correction or attention shall be charged against the Contractor. Such action by the District will not relieve the Contractor of the guarantees provided in this article or elsewhere in this Contract.

This article does not in any way limit the guarantee on any items for which a longer guarantee is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish District with all appropriate guarantee or warranty certificates, in a form acceptable to District, prior to the final payment made to Contractor.

Article 26. NOTICE AND SERVICE THEREOF

- a. Any notice from one party to the other under the Contract shall be in writing and shall be dated and signed by the party giving such notice or by the duly authorized representative of such party. Any such notice shall not be effective for any purpose whatsoever unless served in one of the following manners:
 - 1) If notice is given to District, by personal delivery thereof to District's representative or by depositing same in United States mail, enclosed in a sealed envelope addressed to District for attention of said representative or District, postage prepaid and registered;
 - 2) If notice is given to Contractor, by personal delivery thereof to said Contractor or to his foreman at site of the Project, or by depositing same in United States mail, enclosed in a

sealed envelope addressed to said Contractor at his regular place of business or at such other address as may have been established for the conduct of work under this contract, postage prepaid and registered;

- 3) If notice is given to surety or other person, by personal delivery to such surety or other person or by depositing same in United States mail, enclosed in a sealed envelope addressed to such surety or person at the address of such surety or person last communicated by him to party giving notice, postage prepaid and registered.
- 4) If notice is served by mail, it shall be deemed received and all time periods associated with the giving of notice shall run from the third day after mailing.

Article 27. WORKERS

- a. Contractor shall at all times enforce strict discipline and good order among his employees. Contractor shall not employ on work any unfit person or anyone not skilled in work assigned to him.
- b. Any person in the employ of the Contractor whom the District may deem incompetent or unfit shall be dismissed from work and shall not again be employed on it except with the written consent of District.
- c. The District reserves the right to request that the Project Supervisor be replaced immediately.

Article 28. WAGE RATES, PAYROLL RECORDS AND DEBARMENT

- a. The Contractor is aware of the requirements of California Labor Code sections 1720 et seq. and 1770 et seq., as well as California Code of Regulations, Title 8, section 16000 et seq. ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" and "maintenance" projects. Since this Project involves an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and since the total compensation is \$1,000 or more, Contractor agrees to fully comply with such Prevailing Wage Laws. The Contractor shall obtain a copy of the prevailing rates of per diem wages at the commencement of this Agreement from the website of the Division of Labor Statistics and Research of the Department of Industrial Relations located at www.dir.ca.gov/dlsr/. In the alternative, the Contractor may view a copy of the prevailing rates of per diem wages at the District's Bond Programs, Sustainability, Maintenance and Operations Department. Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to perform work on the Project available to interested parties upon request, and shall post copies at the Contractor's principal place of business and at the Project site. Contractor shall defend, indemnify and hold the District, its elected officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or allege failure to comply with the Prevailing Wage Laws.
- b. The Contractor and each subcontractor shall forfeit as a penalty to the District not more than Two Hundred Dollars (\$200) for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing wage rate for any work done by him, or by any subcontract under him, in violation of the provisions of the California Labor Code. The difference between such stipulated prevailing wage rate and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.
- c. As a further material part of this Agreement, Contractor agrees to hold harmless and indemnify

the District, its Board members, and its officers, employees and agents from any and all claims, liability, loss, costs, damages, expenses, fines and penalties, of whatever kind or nature, including all costs of defense and attorneys' fees, arising from any alleged failure of Contractor or its subcontractors to comply with the Prevailing Wage Laws of the State of California. If the District or any of the indemnified parties are named as a party in any dispute arising from the failure of Contractor or its subcontractors to pay prevailing wages, Contractor agrees that the District and the other indemnified parties may appoint their own independent counsel, and Contractor agrees to pay all attorneys' fees and defense costs of the District and the other indemnified parties as billed, in addition to all other damages, fines, penalties and losses incurred by the District and the other indemnified parties as a result of the action.

- d. Accurate payroll records shall be kept by the Contractor and each subcontractor, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the Work.
- e. It shall be the responsibility of Contractor to comply with Labor Code section 1776 as it may be amended by the Legislature from time to time with respect to each payroll record. Labor Code section 1776 provides in relevant part:

(a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the contractor or subcontractor in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

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

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

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

- (c) Unless required to be furnished directly to the Labor Commissioner in accordance with paragraph (3) of subdivision (a) of Section 1771.4, the certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division. The payroll records may consist of printouts of payroll data that are maintained as computer records, if the printouts contain the same information as the forms provided by the division and the printouts are verified in the manner specified in subdivision (a).
- (d) A contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.
- (e) (1) Except as provided in subdivision (f), any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body or the Division of Labor Standards Enforcement shall be marked or obliterated to prevent disclosure of an individual's name, address, and social security number. The name and address of the contractor awarded the contract or the subcontractor performing the contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a multiemployer Taft-Hartley trust fund (29 U.S.C. Sec. 186(c)(5)) that requests the records for the purposes of allocating contributions to participants shall be marked or obliterated only to prevent disclosure of an individual's full social security number, but shall provide the last four digits of the social security number. Any copy of records made available for inspection by, or furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (29 U.S.C. Sec. 175a) shall be marked or obliterated only to prevent disclosure of an individual's social security number.
- (2) Copies of electronic certified payroll records shall not satisfy payroll records requests made by Taft-Hartley trust funds and joint labor-management committees. Any copy of records requested by, and made available for inspection by or furnished to, a Taft-Hartley trust fund or joint labor-management committee shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.
- (f) (1) Notwithstanding any other provision of law, agencies that are included in the Joint Enforcement Strike Force on the Underground Economy established pursuant to Section 329 of the Unemployment Insurance Code and other law enforcement agencies investigating violations of law shall, upon request, be provided nonredacted copies of certified payroll records. Any copies of records or certified payroll made available for inspection and furnished upon request to the public by an agency included in the Joint Enforcement Strike Force on the Underground Economy or to a law enforcement agency investigating a violation of law shall be marked or redacted to prevent disclosure of an individual's name, address, and social security number.
- (2) An employer shall not be liable for damages in a civil action for any reasonable act or omission taken in good faith in compliance with this subdivision.
- (g) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city, and county, and shall, within five working days, provide a notice of a change of location and address.

(h) The contractor or subcontractor has 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the contractor or subcontractor fails to comply within the 10-day period, the contractor or subcontractor shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit one hundred dollars (\$100) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section.

(i) The body awarding the contract shall cause to be inserted in the contract stipulations to effectuate this section.

- f. Debarment. The Contractor or any subcontractor working under the Contractor may not perform work on a public works project with a subcontractor who is ineligible to perform work on a public project pursuant to Section 1777.1 or Section 1777.7 of the California Labor Code. Any contract on a public works project entered into between the Contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid, or may have been paid to a debarred subcontractor by the Contractor on the project shall be returned to the District. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the project.

Article 29. APPRENTICES

Contractor's attention is directed to the provisions of Sections 1777.5, 1777.6, and 1777.7 of the California Labor Code concerning employment of apprentices by the Contractor or any subcontractor under him. The Contractor shall be knowledgeable of and comply with all California Labor Code sections including 1727, 1773.5, 1775, 1777, 1777.5, 1810, 1813, 1860, including all amendments; each of these sections is incorporated by reference into this Contract. The responsibility for compliance with these provisions for all apprenticeable occupations rests with the Contractor. Knowing violations of Section 1777.5 will result in forfeiture not to exceed \$100 for each calendar day of non-compliance pursuant to Section 1777.7.

Article 30. HOURS OF WORK

- a. As provided in article 3 (commencing at section 1810), chapter 1, part 7, division 2 of the Labor Code, eight (8) hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by the Contractor or by any subcontractor on any subcontract under this Contract upon the Work or upon any part of the Work contemplated by this Contract is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereinafter provided. Notwithstanding the provisions herein above set forth, work performed by employees of Contractor in excess of eight (8) hours per day, and forty (40) hours during any one week, shall be permitted upon this public work upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half times the basic rate of pay.
- b. The Contractor and every subcontractor shall keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the Work or any part of the Work contemplated by this Contract. The record shall be kept open at all reasonable hours to the inspection of the District and to the

Division of Labor Law Enforcement, Department of Industrial Relations of the State of California.

- c. The Contractor shall pay to the District a penalty of twenty-five dollars (\$25) for each worker employed in the execution of this Contract by the Contractor or by any subcontractor 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 article 3 (commencing at section 1810), chapter 1, part 7, division 2 of the Labor Code.
- d. Any work necessary to be performed after regular working hours or on Sundays or other holidays shall be performed without additional expense to District. Refer to Special Conditions for information on specific time-of-day and weekend hour restrictions which apply to this Contract.
- e. For projects occurring on or adjacent to an operating school site, Contractor shall schedule activities to ensure education operations will not be unduly disrupted by significant noise, dust or other impacts reasonably expected to be disruptive to any educational or District programs.

Article 31. INSURANCE

Contractor, at its own cost and expense, shall procure and maintain during the term of this Contract, policies of insurance for the following types of coverage:

- a. Commercial General Liability Insurance. Contractor shall procure and maintain, during the term of this Contract, the following General Liability Insurance coverage:

	Each Occurrence	Aggregate
Moderate risk projects	\$2,000,000	\$4,000,000
Severe risk projects	\$5,000,000	\$10,000,000

Commercial General Liability insurance shall include products/completed operations, property damage, and personal and advertising injury coverage.

Any and all subcontractors hired by Contractor in connection with the Services described in this Contract shall maintain such insurance unless the Contractor’s insurance covers the subcontractor and its employees.

- b. Automobile Liability. Contractor shall procure and maintain, during the full term of this Contract, Automobile Liability Insurance, including non-owned and hired automobiles, as applicable with the following coverage limits:

Personal vehicles: **\$500,000.00** combined single limit or
\$100,000.00 per person / **\$300,000.00** per accident

Commercial vehicles **\$1,000,000.00** per accident

- c. Workers’ Compensation Insurance. Contractor shall procure and maintain, during the term of this Contract, Workers’ Compensation Insurance, as required by California law, on all of its employees engaged in work related to the performance of this Contract. Contractor shall procure and maintain Employers’ Liability insurance coverage of \$1,000,000.

In the case of any such work which is subcontracted, Contractor shall require all subcontractors to provide Workers' Compensation Insurance and Employers' Liability insurance for all of the subcontractor's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workers' Compensation Insurance.

Absent proof of Workers' Compensation Insurance, Contractor will submit a statement requesting a waiver from this requirement and indicating the reason Workers' Compensation Insurance is not required.

- d. **Builder's Risk.** The Contractor shall procure and maintain, during the term of this Contract, Builders' Risk coverage, to cover direct physical loss or damage to the enrolled project as described to the extent of the District's and Contractor's interest in such project and caused by a Covered Cause of Loss. This includes materials, supplies, scaffolding, and temporary structures to be used for the construction, reconstruction, alteration, renovation, or repair.

The limit of this coverage extension is the value of the Project. The described project will be valued at the lesser of the cost to repair or replace without deduction for depreciation, provided that the damaged property covered by the coverage extension is actually repaired or replaced within a reasonable period of time following the date of loss.

The Builders' Risk coverage is extended to cover direct physical loss or damage to materials and supplies while in transit and at temporary storage sites within the United States of America and Canada.

Tools and Equipment owned or used by the Contractor are not covered.

- e. **Other Coverage as Dictated by the District.** Contractor shall procure and maintain, during the term of this Contract, the following other Insurance coverage:

	Each Occurrence	Aggregate
Pollution Liability	\$1,000,000	\$2,000,000

Article 32. PROOF OF CARRIAGE OF INSURANCE

- a. If the Contractor or Contractor's subcontractor(s) maintains broader coverage and/or higher limits than the minimums shown above, the District requires and shall be entitled to the broader coverage and/or higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the District.
- b. Contractor's and any and all subcontractor's insurance is primary and will not seek contribution from any other insurance available to the District.
- c. **Certificates of Insurance.** Contractor and any and all subcontractors working for Contractor shall provide certificates of insurance to the District as evidence of the insurance coverage required herein, not less than Fifteen (15) days prior to commencing work for the District, and at any other time upon the request of the District. Certificates of insurance will be deemed invalid if proper endorsements are not attached. Certificates of such insurance shall be filed with the District on or before commencement of the services under this Contract.

- d. Endorsements. Contractor's and any and all Contractor subcontractor's Commercial General Liability insurance; Commercial Automobile Insurance; Liability Excess, Umbrella and/or Reinsurance; and Abuse and Molestation coverage shall name the District, its governing board, officers, agents, employees, and/or volunteers as additional insureds. All endorsements specifying additional insureds for any of the Insurance Policies shall be as indicated below or an equivalent endorsement reasonably acceptable to the District.
- 1) General Liability
 - Construction: CG 20 10 10 01 and CG 20 37 10 01;
 - 2) Primary, Non-Contributory
 - CG 20 01 01 13
 - 3) Waiver of Subrogation
 - CG 24 04 05 09
 - 4) Commercial Automobile Liability
 - CA 20 48 10 13
- e. Contractor's and any and all Contractor subcontractor's Commercial General Liability insurance shall provide a list of endorsements and exclusions.
- f. Deductibles. Any deductible(s) or self-insured retention(s) applicable to the insurance and/or coverage required by the foregoing provisions of this agreement must be declared to and approved by the District. Contractor shall be responsible to pay that deductible or self-insured retention and the District shall not be responsible to pay these costs. In the event that Contractor's deductibles or self-insured retentions collectively total more than \$50,000.00, District reserves the right to request proof of Contractor's financial solvency in relation to remittance thereof or require Contractor to post a bond guaranteeing payment of the deductible, or both.
- g. Acceptability of Insurers. Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A: VII, unless otherwise acceptable to the District.
- h. Insurance written on a "claims made" basis is to be renewed by the Contractor and all Contractor subcontractors for a period of five (5) years following termination of this Contract. Such insurance must have the same coverage and limits as the policy that was in effect during the term of this agreement and will cover the contractor for all claims made.
- i. Failure to Procure Insurance. Failure on the part of Contractor, or any of its subcontractors, to procure or maintain required insurance shall constitute a material breach of contract under which the District may immediately terminate this Contract.

Article 33. INDEMNIFICATION

Contractor shall defend (with counsel of District's choosing), indemnify and hold the District, its officials, officers, agents, employees, and representatives free and harmless from any and all claims, demands, causes of action, costs, expenses, liabilities, losses, damages or injuries, in law or equity, regardless of whether the allegations are false, fraudulent, or groundless, to property or persons, including wrongful

death, to the extent arising out of or incident to any act, omission, breach, or willful misconduct of Contractor, its officials, officers, employees, agents, consultants and contractors arising out of or in connection with the performance of the Work or this Contract, including claims made by subcontractors for nonpayment, including without limitation the payment of all consequential damages and attorneys' fees and other related costs and expenses. Contractor shall defend, at Contractor's own cost, expense and risk, with counsel of District's choosing, any and all such aforesaid suits, actions or other legal proceedings of every kind that may be brought or instituted against the District, its officials, officers, agents, employees and representatives. To the extent of its liability, Contractor shall pay and satisfy any judgment, award or decree that may be rendered against District, its officials, officers, employees, agents, employees and representatives, in any such suit, action or other legal proceeding. Contractor shall reimburse District, its officials, officers, agents, employees and representatives for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. The only limitations on this provision shall be those imposed by Civil Code Section 2782. Such indemnification shall extend to all claims, demands, or liabilities occurring after completion of the project as well as during the progress of the work. Pursuant to Public Contract Code § 9201, District shall timely notify Contractor of receipt of any third-party claim relating to this Project.

Article 34. LAWS AND REGULATIONS

- a. Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on conduct of the Work as indicated and specified. If Contractor observes that drawings and specifications are at variance therewith, he shall promptly notify the District in writing and any necessary changes shall be adjusted as provided in contract for changes in the Work. If Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to District, he shall bear all costs arising therefrom.
- b. The Contractor shall be knowledgeable regarding and shall comply with applicable portions of California Code of Regulations Title 24, the applicable Building Code, and all other codes, ordinances, regulations or orders of properly constituted authority having jurisdiction over the work of this Project. The Contractor shall examine the Contract Documents for compliance with these codes and regulations and shall promptly notify the Architect of any discrepancies.
- c. All work and materials shall be in full accordance with the latest rules and regulations of the Safety Orders of the Division of Industrial Safety and the applicable State laws and/or regulations. Nothing in the Project plans or Specifications is to be construed to permit work not conforming to the applicable Codes. Buildings and/or all other construction covered by this Contract shall meet all the regulations for access by the physically handicapped as administered by the Division of the State Architect and as may be required by federal or state law. Contractor shall be responsible for familiarity with the Americans with Disabilities Act (ADA) (42 USC 12101 et seq.). Installations of equipment and other devices shall be in compliance with ADA regulations.
- d. If the work under this Contract is for the construction of a school building as defined by the Education Code, then the following provisions shall apply to the Contract:
 - 1) All work shall be executed in accordance with the current requirements of the Education Code and California Code of Regulations Title 24 and Title 19. No deviations from the DSA approved plans and Specifications will be permitted except upon a Change Order or Addenda, signed by the District and Architect and approved by the Division of the State Architect and the State Fire Marshal, if applicable.
 - 2) The Division of the State Architect shall be notified 48 hours in advance of the first pour of concrete.

Article 35. PERMITS AND LICENSES

Permits and licenses necessary for prosecution of The Work shall be secured and paid for by Contractor, unless otherwise specified in the Contract Documents.

- a. Contractor shall obtain and pay for all other permits and licenses required for the Work, including excavation permit and for plumbing, mechanical and electrical work and for operations in or over public streets or right of way under the jurisdiction of public agencies other than the District.
- b. The Contractor shall arrange and pay for all off-site inspection of the Work related to permits and licenses, including certification, required by the specifications, drawings, or by governing authorities, except for such off-site inspections delineated as the District's responsibility pursuant to the Contract Documents.
- c. Before acceptance of the Project, the Contractor shall submit all licenses, permits, certificates of inspection and required approvals to the District.

Article 36. INSPECTION FEES FOR PERMANENT UTILITIES AND EASEMENTS

All inspection fees and other municipal charges for permanent utilities including, but not limited to, sewer, electrical, phone, gas, water, and irrigation shall be paid for by District. Contractor shall be responsible for arranging the payment of such fees, but inspection fees and other municipal fees relating to permanent utilities shall be paid by District. Contractor may either request reimbursement from District for such fees, or obtain the funds from District prior to paying such fees. Easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the District, unless otherwise specified.

Article 37. SURVEYS

Surveys to determine location of property lines and corners will be supplied by the District. Surveys to determine locations of construction, grading, and site work shall be provided by the Contractor.

Article 38. EXCISE TAXES

If under federal excise tax law any transaction hereunder constitutes a sale on which a federal excise tax is imposed and the sale is exempt from such excise tax because it is a sale to a state or local government for its exclusive use, the District, upon request, will execute a certificate of exemption which will certify (1) that the District is a political subdivision of the state for the purposes of such exemption, and (2) that the sale is for the exclusive use of the District. No excise tax for such materials shall be included in any bid price.

Article 39. PATENTS, ROYALTIES, AND INDEMNITIES

The Contractor shall hold and save the District and its officers, agents, and employees harmless from liability of any nature or kind, including cost and expense, for or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of this contract, including its use by the District, unless otherwise specifically stipulated in the contract documents.

Article 40. MATERIALS

- a. Except as otherwise specifically stated in this contract, Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendency, temporary constructions of every nature, and all other services and facilities of every nature whatsoever necessary to execute and complete this Contract within specified time.
- b. Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of good quality.
- c. Materials shall be furnished in ample quantities and at such times as to insure uninterrupted progress of work and shall be stored properly and protected as required. Contractor shall be entirely responsible for damage or loss by weather or other causes to materials or work under this contract.
- d. No materials, supplies, or equipment for Work under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in work and agrees upon completion of all Work to deliver premises, together with all improvements and appurtenances constructed or placed thereon by him, to District free from any claims, liens, or charges. Contractor further agrees that neither he nor any person, firm, or corporation furnishing any materials or labor for any Work covered by this Contract shall have any right to a lien upon premises or any improvement or appurtenance thereon, except that Contractor may install metering devices or other equipment of utility companies or of political subdivisions, title to which is commonly retained by the utility company or political subdivision. In event of installation of any such metering device or equipment, Contractor shall advise District as to owner thereof. Nothing contained in this article, however, shall defeat or impair right of persons furnishing material or labor under any bond given by Contractor for their protection or any rights under any law permitting such persons to look to funds due to Contractor in the hands of the District, and this provision shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing material for work when no formal contract is entered into for such material.
- e. Materials shall be stored on the Project site in such manner so as not to interfere with any operations of the District or any independent contractor.

Article 41. SUBSTITUTIONS

- a. Wherever in the drawings or Specifications a material or product is called for by trade or brand names or manufacturer and model number, alternative items of equal quality and purpose may be proposed for use by the Contractor, as specified in the Instructions to Bidders. The burden of proof of equality is on the Contractor, and Contractor shall furnish all information and supplies necessary for the Architect and District to make a thorough evaluation of the proposed substitution. The decision about the equality of the proposed substitution is final, and if the proposed substitution is not approved, the Contractor shall install the item called for. Proposed substitutions and any changes in adjacent work caused by them shall be made by the Contractor at no additional cost to the District.
- b. Proposed substitutions shall be submitted sufficiently before actual need to allow time for thorough evaluation. Substitutions shall not be proposed for the reason that submittals were not made early enough to avoid delay. The review of substitutions shall not relieve the Contractor from complying with the requirements of the drawings and Specifications.

- c. In the event Contractor makes substitutions in materials, equipment, or designs, with or without the District's approval, other than those authorized herein, the Contractor shall then assume full responsibility for the effects of such substitutions on the entire Project, including the design, and shall reimburse the District for any charges resulting from such substitutions, including any charges for modifications in the work of other trades, and including any charges for additional design and review, plus reasonable and customary mark-ups.

Article 42. SUBMITTALS, SHOP DRAWINGS, CUTS AND SAMPLES

- a. Five (5) copies of shop drawings, brochures and cuts and samples in quantities specified by the Architect shall be submitted to the Architect for all items for which they are required by the plans and Specifications. Prior to transmittal, the Contractor shall examine all submittals for accuracy and completeness in order to verify their suitability for the work and compliance with the Contract Documents and shall sign and date each submittal. Submittals shall be made sufficiently before the items are required for the work so as to cause no delay and shall be in accordance with the Project construction schedule.
- b. In addition to information furnished as common practice, submittals shall contain the Project name and location, Contractor's name and address, Subcontractor's or supplier's name and address, date of submittal and any revisions, and reference to appropriate specification section, and/or drawing and detail numbers. The Contractor and/or the Subcontractors shall verify in the field all dimensions and relationships to adjacent work necessary to ensure the proper fit of the items submitted. If necessary, the Contractor shall make any corrections required and resubmit with all due haste in the same number as initially required.
- c. Review of submittals, shop drawings, cuts or samples by the District or Architect shall not relieve the Contractor from complying with the requirements of the Contract Documents.
- d. Any materials or equipment installed without approval shall be at the Contractor's own risk, and Contractor may be required to remove any such materials or equipment and install the specified items at Contractor's own cost, including repairs to adjacent work.

Article 43. INSTRUCTIONS AND MANUALS

Three (3) copies of the maintenance instructions, application/installation instructions and service manuals called for in the Specifications shall be provided by the Contractor. These shall be complete as to drawings, details, parts lists, performance data and other information that may be required for the District to easily maintain and service the materials and equipment installed under this Contract. All manufacturer's application/installation instructions shall be given to the Architect at least ten (10) days prior to first material application or installation of the item. The maintenance instructions and manuals, along with any specified guarantees, shall be delivered to the Architect for review prior to submitting to District, and the Contractor or appropriate Subcontractors shall instruct District's personnel in the operation and maintenance of the equipment prior to final acceptance of the Project.

Article 44. CLOSEOUT SUBMITTALS

The Contractor shall be responsible for the timely delivery of the technical manuals, warranties and guarantees as required in the technical specifications. The final payment will not be made until the District representative has had an opportunity to review and accept the required documents.

Article 45. PROGRESS PAYMENTS AND RETENTION

a. Cost Breakdown:

Prior to submitting Contractor's first request for payment, the Contractor shall prepare and submit to the Architect and District a cost breakdown (schedule of values) showing the major work items for each trade or operation required in construction of the Project. The work items shall be sufficiently detailed to enable the Architect to accurately evaluate the completion percentages requested by the Contractor. The cost for each work item shall include overhead and profit. The total of all work item costs shall equal the amount of the Contract.

b. Scope of Payment:

Payment to the Contractor at the unit price or other price fixed in the Contract for performing the work required under any item or at the lump sum price fixed in the Contract for performing all the work required under the Contract shall be full compensation for furnishing all labor, materials, equipment and tools necessary to the work, and for performing and completing, in accordance with the Specifications, all work required under the item or under the Contract, and for all expense incurred by the Contractor for any purpose in connection with the performance and completion of the work.

c. Progress Payments:

The Contractor will, on or about the last day of each month, make an estimate of the value of the work completed by Contractor in the performance of the Contract. These estimates shall be subject to the review and approval of the Architect. The first such estimate will be of the value of the work completed after the Contractor commenced the performance of the Contract, and every subsequent estimate, except the final estimate, will be of the value of the work completed since the immediately preceding estimate. Such estimates will be based on labor, materials and equipment incorporated into the work, and items of materials and equipment delivered to the Project. The Contractor shall be responsible for the security and protection of such materials and equipment delivered to the Project and not incorporated in the work. Within thirty (30) calendar days after the approval of each estimate for progress payment, the District will pay to the Contractor an amount equal to ninety five (95) percent of the approved estimate, unless a different retention percentage is stated in the Notice to Bidders, in which case that percentage applies. Payments may at any time be withheld if in the judgment of the District the work is not proceeding in accordance with the Contract Documents, the Contractor is not complying with the requirements of the Contract, stop notices have been timely filed, the estimate contains an error, or the District has incurred costs or requests reasonable financial assurances regarding defective work by the Contractor.

d. Final Payment:

Within thirty (30) days after all required work is fully completed in accordance with the Contract Documents, the Contractor shall submit a final invoice for the total value of the work completed in accordance with the Contract, which shall be subject to review and approval by the District. As required by law, District shall pay Contractor the unpaid balance of the Contract price of the work, or the whole Contract price of the work if no progress payment has been made, determined in accordance with the terms of the Contract, less such sums as may be lawfully retained under any provision of the Contract, including, but not limited to, amounts retained as liquidated damages, for stop notices, for third-party claims for which the Contractor is required to indemnify the District, for defective work and costs incurred by the District in connection therewith, or for other such claims and damages attributable to the Contractor ("Final Payment"). Prior progress estimates and payments are subject to correction in the Final Payment. Tender of the Final Payment shall constitute denial by the District of any unresolved claim. Contractor's acceptance of the Final Payment shall operate as a full and final release to the District and its agents from any and all unasserted claims Contractor has, or may have, related to this Contract. Pursuant to California Public Contract Code §7107, if there is any dispute between the District and the Contractor at the time that disbursement of the Final Payment is due, the District may withhold from disbursement of the Final Payment an amount not to exceed one hundred fifty percent (150%) of the amount in dispute.

e. Payments Do Not Imply Acceptance of Work:

The granting of any progress payment or payments by the District or the receipt thereof by the Contractor shall not constitute acceptance of the work or of any portion thereof, and shall in no way lessen the liability of the Contractor to replace unsatisfactory work or material, whether or not the unsatisfactory character of such work or material was apparent or detected at the time such payment was made.

f. Retention of Sums Charged Against Contractor:

It is mutually understood and agreed that when under any provision of this Contract, the District shall charge any sums of money against the Contractor, the amount of such charge shall be

deducted and retained by the District from the amount of the next succeeding progress estimate, or from any other monies due or that may become due the Contractor on account of the Contract. If on completion or termination of the Contract such monies due the Contractor are found insufficient to cover the District's charges against the Contractor, the District shall have the right to recover the balance from the Contractor or the Contractor's Sureties.

g. Release:

The Contractor and each assignee under an assignment in effect at the time of Final Payment shall, if required by the District, execute and deliver at the time of Final Payment and as a condition precedent to Final Payment, a release in form and substance satisfactory to and containing such exemptions as may be found appropriate by the District, discharging the District, its officers, agents and employees of and from liabilities, obligations and claims arising under this Contract.

h. Payment to Subcontractors and Suppliers:

The Contractor shall pay each Subcontractor and supplier promptly on receipt of each progress payment from the District for the materials, labor and equipment delivered to the site or incorporated in the work by each Subcontractor during the period for which the progress payment is made, less any retention as provided above.

i. Stop Notice Costs:

The District reserves the right to charge the Contractor or Surety, or to withhold from release of retention, all costs incurred by the District, including attorney's fees, for processing and defending stop notice claims.

j. Whenever any part of the Work is in a condition suitable for use, and the best interest of the District requires such use, the District may take possession of, connect to, open for public use, or use a part thereof. When so used, maintenance and repairs due to ordinary wear and tear or vandalism will be made at District's expense. The use by the District as contemplated in this section shall in no case be construed as constituting acceptance of the Work or any part thereof. Such use shall neither relieve the Contractor of any of his responsibilities under the Contract nor act as a waiver by the District of any of the conditions thereof. Contractor shall continue to maintain all insurance, including Builder's Risk insurance, on the Project.

Article 46. PAYMENTS WITHHELD

In addition to amounts which the District may retain under other provisions of the Contract Documents, the District may withhold payments due to Contractor as may be necessary to cover:

- a. Stop Payment Notice Claims.
- b. Defective work not remedied.
- c. Failure of Contractor to make proper payments to its subcontractors or suppliers.
- d. Completion of the Contract if there exists a reasonable doubt that the Work can be completed for balance then unpaid.
- e. Damage to another contractor or third party.

- f. Amounts which may be due the District for claims against Contractor.
- g. Failure of Contractor to keep the record (“as-built”) drawings up to date.
- h. Failure to provide updates on the construction schedule.
- i. Site clean-up.
- j. Failure of the Contractor to comply with requirements of the Contract Documents.
- k. Liquidated damages.
- l. Legally permitted penalties.

Upon completion of the Contract, the District will reduce the final Contract amount to reflect costs charged to the Contractor, back charges or payments withheld pursuant to the Contract Documents.

District may apply such withheld amount or amounts to payment of such claims or obligations at its discretion. In so doing, District shall be deemed the agent of Contractor and any payment so made by District shall be considered as a payment made under the Contract by District to Contractor and District shall not be liable to Contractor for such payments made in good faith. Such payments may be made without prior judicial determination of claim or obligations. District will render Contractor a proper accounting of such funds disbursed on behalf of Contractor.

Article 47. CHANGES AND EXTRA WORK

a. Changes in the Work:

- 1) The District, before the date of acceptance of the work, may, without notice to the Sureties, order changes in the work (“Modifications”), may order extra materials and extra work in connection with the performance of the Contract, and the Contractor shall promptly comply with such orders. All Modifications must be approved by DSA and the State Fire Marshall, if applicable, as required by law.
- 2) If changes ordered in design, workmanship or materials are of such a nature as to increase or decrease the cost of any part of the work, the price fixed in the Contract shall be increased or decreased by such amount as represents the reasonable and proper allowance for the increase or decrease in the cost of the work in accordance with the provisions of this Article, and any other applicable terms of the Contract, including, but not limited to, the Contractor’s schedule of values and the price for allowances, if any. Except as provided by law, the total cost of all Modifications shall not exceed ten (10) percent of the original Contract price.
- 3) In the case of a disputed work item, the District may direct the Contractor to perform the disputed work at no additional cost to the District on the grounds that the work is adequately indicated in the Contract Documents, and therefore already included in the Contract price. If the Contractor maintains that the disputed work represents a modification to the Contract, Contractor may submit a claim in accordance with Article 78, Dispute Resolution. Notwithstanding any dispute regarding the requirements of the Contract Documents, Contractor shall promptly and fully comply with the District’s directive. Contractor’s failure to do so shall be deemed a material breach of this Contract, and in addition to all other remedies, District may, at its sole discretion, hire another contractor and/or use its own forces to complete the disputed work at Contractor’s sole

expense, and may deduct the cost of such work from the Contract price.

b. Cost Breakdown:

When the Modification is proposed, the Contractor shall furnish a complete breakdown of actual costs of both credits and extras, itemizing materials, labor, taxes, overhead and profit. Subcontract work shall be so indicated. All costs must be fully documented. The following limitations shall apply:

1) Limitations Where Contract Price Changes are Involved:

- (a) Overhead and Profit for the Contractor. The Contractor's overhead and profit on the cost of subcontracts shall be a sum not exceeding ten percent (10%) of such costs. The Contractor's overhead and profit on the costs of work performed by the Contractor shall be a sum not exceeding fifteen percent (15%) of such costs. Overhead and profit shall not be applied to the cost of taxes and insurance by Contractor or Subcontractors or to credits. No processing or similar fees may be charged by the Contractor in connection with the Modification. "Overhead and profit" shall include all plant, equipment rental and repair, project management, field coordination, job site project supervision and indirect labor and materials.
- (b) Bond Premiums. The actual rate of bond premiums as paid on the total cost (including taxes) will be allowed, but with no markup for profit and overhead.
- (c) Taxes. State and city sales taxes should be indicated. Federal excise tax shall not be included. (District will issue an exemption on request.)

2) Change Order Certification:

All change orders and requests for proposed change orders shall be deemed to include the following certification by the Contractor:

"The undersigned Contractor approves the foregoing as to the changes in work, if any, and as to the Contract price specified for each item and as to the extension of time allowed, if any, for completion of the Project as stated herein, and agrees to furnish all labor, materials, and service and to perform all work necessary to complete any additional work specified for the consideration stated herein. Submission of claims which have no basis in fact or which Contractor knows are false are made at the sole risk of the Contractor and may be a violation of the False Claims Act, as set forth in Government Code §§12650 et seq. It is understood that the changes to the Contract Documents set forth herein shall only be effective upon approval by the Board of Trustees of the District.

"It is expressly understood that the value of the extra work or changes expressly includes any and all of the Contractor's costs and expenses, both direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project. Any costs, expenses, damages, or time extensions not included herein are deemed waived."

c. Unit Prices, Schedule of Values, or Allowances:

Where Unit Prices, a Schedule of Values, and/or Allowances are required by the Contract Documents, that pricing shall govern in computing any additions to or deductions from the Contract price on account of any added or omitted work. Unit Prices listed in the original bid include all costs and no addition of any description will be allowed.

d. Time and Materials:

If it is impractical, because of the nature of the work, or for any other reason, to fix an increase in price in advance, the Change Order may fix a maximum price which shall not under any circumstances be exceeded, and subject to such limitation, such alteration, modification or extra shall be paid for at the actual necessary cost as determined by the sum of the following items (1) to (5) inclusive:

- 1) Labor, including premium on compensation insurance and charge for Social Security taxes, and other taxes pertaining to labor.
- 2) Material, including sales taxes and other taxes pertaining to materials.
- 3) Plant and equipment rental, to be agreed upon in writing before the work is begun. No charge for the cost of repairs to plant or equipment will be allowed.
- 4) Overhead and profit computed at fifteen percent (15%) of the total of Items (1) to (3) inclusive.
- 5) The proportionate cost of premiums on bonds computed at one and one-half percent (1-1/2%) of the total of items (1) to (4) inclusive.

If the Time and Materials work is done by a Subcontractor, the amount shall be determined as set forth above under items (1) to (5) inclusive. The Contractor's overhead and profit on the costs of subcontracts (exclusive of taxes and insurance) shall not exceed ten percent (10%) of such costs.

The District reserves the right to furnish such materials as it may deem expedient, and no allowance will be made for profit thereon. The above-described methods of determining the payment for work and materials shall not apply to the performance of any work or the furnishing of any material which, in the judgment of the District, may properly be classified under items for which prices are established in the Contract.

e. Oral Modifications:

No oral statements of any person shall in any manner or degree modify or otherwise affect the terms of the Contract.

f. No dispute, disagreement or failure of the parties to reach agreement on the terms of the change order shall relieve the Contractor from the obligation to proceed with performance of the Work, including extra work, promptly and expeditiously.

g. Any alterations, extensions of time, extra work or any other changes may be made without securing consent of the Contractor's surety or sureties.

Article 48. DEDUCTIONS FOR UNCORRECTED WORK

If District deems it inexpedient to correct work injured or not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore.

Article 49. WARRANTY OF TITLE

Contractor warrants that title to all work, materials or equipment included in a request for payment shall pass and transfer to the District whether or not they are installed or incorporated in the Project, free from

any claims, liens or encumbrances, when such payment is made to the Contractor. Contractor further warrants that no such work, materials or equipment have been purchased for work under the Contract subject to an agreement by which an interest therein or an encumbrance thereon is retained by the seller or supplier.

Article 50. CONTRACTOR'S SUPERVISION

- a. Unless personally present on the premises where the Work is being done, Contractor shall keep on the Work, during its progress, a competent full-time job (project) superintendent satisfactory to District. The job superintendent shall not be changed except with the written consent of the District unless the job superintendent proves to be unsatisfactory to Contractor and ceases to be in his employ. The job superintendent shall represent Contractor in his absence and all directions given to him shall be as binding as if given to Contractor. Other directions shall be so confirmed on written request in each case.
- b. Contractor shall give efficient supervision to the Work, using his best skill and attention to control safety and job coordination. He shall carefully study and compare all drawings, specifications, and other instructions and shall at once report to District any error, inconsistency or omission which he may discover. The Contractor shall not be liable to District for any damage resulting from errors or deficiencies in the Contract Documents or other instructions by the District.

Article 51. DOCUMENTS ON WORK

- a. Contractor shall keep one copy of all Contract Documents, including addenda, change orders, Division I, Title 21 of the California Code of Regulations, Parts 1-5 and 12 of Title 24 of the California Code of Regulations, and the prevailing wage rates applicable at the time of the Contract, which are a part of Contract Documents, on the job at all times. Said documents shall be kept in good order and shall be available to the District and District representative. Contractor shall be acquainted with and comply with the provisions of said Titles 21 and 24 as they relate to this Project. (See particularly Duties of the Contractor, Title 24 California Code of Regulations, section 4-343.) Contractor shall also be acquainted with and comply with all California Code of Regulations provisions relating to this project, particularly Titles 17, 19, 21, and 24.
- b. Contractor shall also make available all books, records, accounts, contracts, bids, etc. upon request by the District.

Article 52. RECORD ("AS BUILT") DRAWINGS

- a. Contractor shall maintain a clean, undamaged set of Contract drawings and shop drawings. In addition to maintaining one complete set of record drawings (herein referred to as "as-builts"), Contractor shall require each trade to do its own as-builts. The trade as-builts shall contain information showing clean and clear drawings with horizontal and vertical controls suitable for conversion to electronic media. Graphic quality must be equal to clean and clear original drawings; adequacy of the drawings shall be determined by the District's representative or the District. Contractor shall mark the set to show the actual installation where the installation varies from the Work as originally shown. Contractor shall mark whichever drawings are most capable of showing conditions fully and accurately where shop drawings are used, and shall record a cross-reference at the corresponding location on the Contract drawings. Contractor shall give particular attention to concealed elements that would be difficult to measure and record at a later date. Contractor shall use colors to distinguish variations in separate categories of the work.
- b. Contractor shall note related change order numbers where applicable. Contractor shall organize

record drawings sheets into manageable sets, bound with durable paper cover sheets and shall print suitable title, dates and other identification on the cover of each set.

- c. At the end of the Project, the Contractor shall provide the District representative with a complete set of as-built drawings. The complete set shall contain information showing clean and clear drawings with horizontal and vertical controls suitable for conversion to electronic media. Graphic quality must be equal to clean and clear original drawings; adequacy of the drawings shall be determined by the District's representative or District. The as-builts must show the entire site for each major trade, including but not limited to water, sewer, electrical, data, telephone, cable, fire, alarm, gas, and plumbing.

Article 53. UTILITY USAGE

- a. All temporary utilities, including but not limited to electricity, water, gas, and telephone used on work shall be furnished and paid for by Contractor. Contractor shall furnish and install necessary temporary distribution systems, including meters, if necessary, from distribution points to points on site where utility is necessary to carry on the Work. Upon completion of the Work, Contractor shall remove all temporary distribution systems.
- b. Contractor shall provide necessary and adequate utilities and pay all costs for water, electricity, gas, oil, and sewer charges required for completion of the Project.
- c. All permanent meters installed shall be listed in the Contractor's name until completion occurs, as defined in Article 77 hereof, at which time further pro-rating will be determined if necessary. When the District begins using the Project, charges over and above power actually used for construction will be the responsibility of the District.
- d. If the Contract is for construction in existing facilities, Contractor may, with written permission of the District, use the District's existing utilities by making prearranged payments to the District for utilities used by Contractor for construction.

Article 54. TRENCHING OR OTHER EXCAVATIONS

- a. Excavations or Trenches Deeper than Four Feet:

If the Project involves digging trenches or other excavations that extend deeper than four feet, the following provisions shall be a part of this Contract:

- 1) The Contractor shall promptly, and before the following conditions are disturbed, provide written notice to the District if the Contractor finds any of the following conditions:
 - (a) Material that the Contractor believes may be a hazardous waste, as defined in §25117 of the Health and Safety Code, which is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law.
 - (b) Subsurface or latent physical conditions at the site which are different from those indicated or expected.
 - (c) Unknown physical conditions at the site of any unusual nature or which are materially different from those ordinarily encountered and generally recognized as inherent in work which the Contractor generally performs.

- 2) In the event that the Contractor notifies the District that Contractor has found any of the conditions specified in subparagraphs (a), (b) or (c), above, the District shall promptly investigate the condition(s). If the District finds that the conditions are materially different or that a hazardous waste is present at the site which will affect the Contractor's cost of, or the time required for, performance of the Contract, the District shall issue a change order in accordance with the procedures set forth in this Contract.
- 3) In the event that a dispute arises between the District and the Contractor regarding any of the matters specified in Paragraph (2), above, the Contractor shall proceed with all work to be performed under the Contract and the Contractor shall not be excused from completing the Project as provided in the Contract. In performing the work pursuant to this Paragraph, the Contractor retains all rights provided by Article 78 which pertains to the resolution of disputes between the contracting parties.

b. Regional Notification Center:

The Contractor, except in an emergency, shall contact the appropriate regional notification center at least two (2) days prior to commencing any excavation if the excavation will be conducted in an area that is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. No excavation shall be commenced and/or carried out by the Contractor unless an inquiry identification number has been assigned to the Contractor or any Subcontractor and the Contractor has given the District the identification number. Any damages or delays arising from Contractor's failure to make appropriate notification shall be at the sole risk and expense of the Contractor and shall not be considered for an extension of the Contract time.

c. Existing Utility Lines:

- 1) Pursuant to Government Code §4215, the District assumes the responsibility for removal, relocation, and protection of main or trunk utility lines and facilities located on the construction site at the time of commencement of construction under this Contract with respect to any such utility facilities that are not identified in the plans and Specifications. Contractor shall not be assessed liquidated damages for delay in completion of the Project caused by the failure of the District or the owner of a utility to provide for removal or relocation of such utility facilities.
- 2) Locations of existing utilities provided by the District shall not be considered exact, but approximate within reasonable margin and shall not relieve Contractor of responsibilities to exercise reasonable care nor costs of repair due to Contractor's failure to do so. The District shall compensate Contractor for the costs of locating and repairing damage not due to the failure of Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and Specifications with reasonable accuracy.
- 3) No provision herein shall be construed to preclude assessment against Contractor for any other delays in completion of the Project. Nothing in this section shall be deemed to require the District to indicate the presence of existing service laterals, appurtenances, or other utility lines, with the exception of main or trunk lines, whenever the presence of such utilities on the site of the construction Project can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of the construction.
- 4) If Contractor, while performing work under this Contract, discovers utility facilities not

identified by the District in the Project plans and Specifications, Contractor shall immediately notify the District and the utility in writing. The cost of repair for damage to above-mentioned visible facilities without prior written notification to the District shall be borne by the Contractor.

d. Prompt Notification:

Contractor understands, acknowledges and agrees that the purpose for prompt notification to the District pursuant to these provisions is to allow the District to investigate the condition(s) so that the District shall have the opportunity to decide how the District desires to proceed as a result of the conditions. Accordingly, failure of Contractor to promptly notify the District in writing, pursuant to these provisions, shall constitute Contractor's waiver of any claim for damages incurred as a result of the conditions.

e. Trenches Five Feet and Deeper:

Pursuant to Labor Code §6705, if the Contract price exceeds \$25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of excavation, promptly submit to the District and/or a registered civil or structural engineer employed by the District or Architect, a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

Article 55. PROTECTION OF WORK AND PROPERTY

- a. The Contractor shall be responsible for all damages to persons or property that occur as a result of his fault or negligence arising from or in connection with the prosecution of this Contract. Contractor shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance by the District. All work shall be solely at the Contractor's risk. Contractor shall adequately protect adjacent property from settlement or loss of lateral support as provided by law and the Contract Documents. Contractor shall take all necessary precautions for the safety of employees on the project and shall comply with all applicable safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where work is being performed. Contractor shall erect and properly maintain at all times, as required by conditions and progress of work, all necessary safeguards, signs, 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. Contractor shall designate a responsible member of his organization on the Work, whose duty shall be prevention of accidents. The name and position of the person so designated shall be reported to the District by Contractor.
- b. In an emergency affecting safety of life or of work or of adjoining property, Contractor, without special instruction or authorization from the District, is hereby permitted to act, at his discretion, to prevent such threatened loss or injury, and he shall so act, without appeal, if so authorized or instructed by the District. Any compensation claimed by Contractor on account of emergency work shall be determined by agreement.
- c. Contractor shall provide such heat, covering, and enclosures as are necessary to protect all work, materials, equipment, appliances, and tools against damage by weather conditions.
- d. Contractor shall take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, adjoining property, and structures, and to avoid damage thereto, and repair any damage thereto caused by construction operations. Contractor shall:

1. Enclose the working area with a substantial barricade, arrange work to cause minimum amount of inconvenience and danger to students and faculty in their regular school activities, and perform work which so as to not interfere with school routine before or after school hours. (This subsection applies to new construction on existing sites.)
2. Provide substantial barricades around any shrubs or trees indicated to be preserved.
3. Deliver materials to the building area over a route designated by the District.
4. When directed by the District, take preventive measures to eliminate objectionable dust.
5. Confine Contractor's apparatus, the storage of materials, and the operations of his workers to limits indicated by law, ordinances, permits, or directions of District. Contractor shall not unreasonably encumber the premises with his materials. Contractor shall enforce all instructions of the District regarding signs, advertising, fires, danger signals, barricades, and smoking and require that all persons employed on work comply with all regulations while on the construction site.
6. Take care 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 civil engineer or land surveyor, licensed in the State of California, at no cost to the District.

Article 56. LAYOUT AND FIELD ENGINEERING

All field engineering required for laying out this work and establishing grades for earthwork operations shall be furnished by the Contractor at his expense. Such work shall be done by a qualified civil engineer or land surveyor licensed in California and approved by the District. Any required "as-built" drawings of site development shall be prepared by the a qualified civil engineer or land surveyor licensed in California and approved by the District.

Article 57. HAZARDOUS MATERIALS

Unless otherwise specified, this Contract does not include the removal, handling, or disturbance of any hazardous substances or materials encountered in the new construction or on the Project grounds. If such substances or materials are encountered, work shall cease in that area and the District shall be promptly notified to take appropriate action for removal or otherwise abating the condition in accordance with current regulations applicable to the District.

a. General:

- 1) No asbestos, asbestos-containing products or other hazardous materials shall be used in this construction or in any tools, devices, clothing or equipment used to further this construction.
- 2) Asbestos and/or asbestos containing products shall be defined as all items containing but not limited to chrysotile, crocidolite, amosite, anthophyllite, tremo-lite or actinolite.
- 3) Any or all material containing greater than one tenth of one percent (>.1%) asbestos shall be defined as asbestos-containing material.
- 4) Any disputes involving the question of whether or not material contains asbestos shall be settled by electron microscopy; the cost of any such tests shall be paid by the Contractor.

- 5) All work or materials found to contain asbestos or work or material installed with asbestos containing equipment will be immediately rejected and this work shall be removed by the Contractor at no additional cost to the District.

b. Decontamination and Removal of Hazardous Material from Prior Work:

- 1) Decontamination and removal of work found to contain asbestos or work installed with asbestos containing equipment shall be done only under the supervision of a qualified consultant, knowledgeable in the field of asbestos abatement and accredited by the Environmental Protection Agency (“EPA”).
- 2) The asbestos removal contractor shall be an EPA-accredited contractor qualified in the removal of asbestos subject to the approval of the District.
- 3) The asbestos consultant shall be chosen and approved by the District which shall have sole discretion and final determination in this matter.
- 4) The work will not be accepted until asbestos contamination is reduced to levels deemed acceptable by the asbestos consultant.

c. Hold Harmless:

- 1) Interface of work under this Contract with work containing asbestos shall be executed by the Contractor at Contractor’s risk and at Contractor’s discretion with full knowledge of the currently accepted standards, hazards, risks and liabilities associated with asbestos work and asbestos containing products. By execution of this Contract the Contractor acknowledges the above and agrees to hold harmless, as set forth in the indemnity provisions of this Contract, the Owner, its employees, agents and assigns for all asbestos liability which may be associated with this work and agrees to instruct Contractor’s employees and agents with respect to the above-mentioned standards, hazards, risks and liabilities.
- 2) The Contractor shall, prior to commencement of this work, provide a duly signed and notarized affidavit that Contractor has instructed Contractor’s employees and agents with respect to the above mentioned standards, hazards, risks and liabilities and the contents and requirements of this portion of the Contract Documents.

d. Certification:

The Contractor agrees that materials containing asbestos or other hazardous materials as defined in Federal and State law shall not be used in construction.

Article 58. TEMPORARY FACILITIES

- a. The Contractor shall obtain permits for, install and maintain in safe condition all scaffolds, hoisting equipment, barricades, walkways, or other temporary structures that may be required to accomplish the work. Such structures shall be adequate for the intended use and capable of safely accepting all loads that may be imposed upon them. They shall be installed and maintained in accordance with all applicable codes and regulations.
- b. The Contractor shall provide and maintain temporary heat from an approved source whenever in the course of the work it may become necessary for curing, drying or warming spaces as may be required for the proper installation of materials or finishes. The Contractor shall provide and

maintain any and all facilities that may be required for dewatering in order that work may proceed on the Project. If it is necessary for dewatering to occur continually, the Contractor shall have on hand whatever spare parts or equipment that may be required to avoid interruption of service or work.

- c. The Contractor shall promptly remove all such temporary facilities when they are no longer needed for the work or on completion of the Project. The Contractor shall repair any damage to premises or property which resulted from the construction, use, or removal of temporary facilities

Article 59. SANITARY FACILITIES

Contractor shall provide sanitary temporary toilet buildings for the use of all workers. All toilets shall comply with local codes and ordinances. Toilets shall be kept supplied with toilet paper and shall have workable door fasteners. Toilets shall be serviced no less than once weekly and shall be present in a quantity of not less than 1 per 20 workers or fraction thereof each sex as required by CAL-OSHA regulation. The toilets shall be maintained in a sanitary condition at all times. Use of toilet facilities in The Work under construction shall not be permitted. Any other sanitary facilities required by CAL-OSHA shall be the responsibility of the Contractor.

Article 60. USE OF ROADWAYS AND WALKWAYS

The Contractor shall not unnecessarily interfere with use of any roadway, walkway or other facility for vehicular or pedestrian traffic by any party entitled to use it. Wherever such interference becomes necessary for the proper and convenient performance of the work and no satisfactory detour route exists, the Contractor shall, before beginning the interference, provide a satisfactory detour, temporary bridge, or other proper facility for traffic to pass around or over the interference and shall maintain it in satisfactory condition as long as the interference continues, all without extra payment unless otherwise expressly stipulated in the Contract Documents.

Article 61. SIGNS

No signs may be displayed on or about the District's property (except those which may be required by law) without the District's prior written approval of size, content and location. Any signs required by the District will be designated in the special conditions.

Article 62. CUTTING AND PATCHING

- a. Contractor shall do all cutting, fitting, or patching of work as required to make its several parts come together properly and fit it to receive or be received by work of other contractors showing upon, or reasonably implied by, the drawings and specifications for the completed structure. Contractor shall make good after them as District may direct.
- b. All cost caused by defective or ill-timed work shall be borne by party responsible therefore.
- c. Contractor shall not endanger any work by cutting, excavating, or otherwise altering work and shall not cut or alter work of any other contractor save with consent or at the direction of the District.

Article 63. CLEANING UP

- a. Contractor at all times shall keep premises free from debris such as waste, rubbish, and excess materials and equipment caused by this Work. Contractor shall not leave debris under, in, or about the premises. Upon completion of the Work, Contractor shall clean the interior and exterior

of the building or improvement including fixtures, equipment, walls, floors, ceilings, roofs, window sills and ledges, horizontal projections, and any areas where debris has collected so surfaces are free from foreign material or discoloration. Contractor shall clean and polish all glass, plumbing fixtures, and finish hardware and similar finish surfaces and equipment and contractor shall also remove temporary fencing, barricades, planking and construction toilet and similar temporary facilities from the site.

- b. Final cleaning, such as sweeping, dusting, vacuuming, dry and wet mopping, polishing, sealing, waxing and other finish operations normally required on newly installed work shall be taken to indicate the finished conditions of the various new and existing surfaces at the time of acceptance. Prior to the time of acceptance, all marks, stains, fingerprints, dust, dirt, splattered paint and blemishes resulting from the various operations shall be removed throughout the Project. Stair treads and risers shall be wet-mopped. Glass shall be left clean and polished both inside and outside. Plumbing fixtures and light fixtures shall be washed clean. Hardware and other unpainted metals shall be cleaned and all building papers and other temporary protections shall be removed throughout the building, or portion of the building where Contractor was involved, all to the satisfaction of the Architect and District. The exterior of the buildings, playfields, exterior improvements, and planting spaces and other work areas shall be similarly clean and in good order. See Special Conditions for additional requirements and instructions.

Article 64. CORRECTION OF WORK BEFORE FINAL PAYMENT

- a. Contractor shall promptly remove from the premises all Work condemned by District as failing to conform to the Contract Documents, whether incorporated or not. Contractor shall promptly replace and re-execute his own Work to comply with contract documents without additional expense to the District and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.
- b. If Contractor does not remove such condemned Work within a reasonable time, fixed by written notice, District may remove it and may store the material at Contractor's expense. If Contractor does not pay expenses of such removal within ten (10) days' time thereafter, District may, upon ten (10) days' written notice, sell such materials at auction or at private sale and shall account for net proceeds thereof, after deducting all costs and expenses that should have been borne by Contractor.

Article 65. ACCESS TO WORK

District and its representatives shall at all times have access to the Work wherever it is in preparation or progress. Contractor shall provide site access to Department of Industrial Relations personnel upon request. Contractor shall provide safe and proper facilities for such access so that the District's representatives may perform their functions under the Contract.

Article 66. OCCUPANCY

District reserves the right to occupy buildings at any time before completion, and such occupancy shall not constitute final acceptance of any part of the Work covered by this Contract.

Article 67. DISTRICT'S INSPECTOR

- a. If applicable, an inspector will be employed by District in accordance with requirements of Title 24 of the California Code of Regulations and will be assigned to the work. His duties are specifically defined in Part 1, Title 24, Section 4-342 of the California Code of Regulations.

- b. All work shall be under the observation of said inspector. He shall have free access to any or all parts of work at any time. Contractor shall furnish inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting progress and manner of Work and character of materials, including assisting with Inspector's monthly reports. Inspection of Work shall not relieve Contractor from any obligation to fulfill this contract. Inspector or District shall have authority to stop Work whenever the provisions of the Contract Documents are not being complied with and Contractor shall instruct his employees accordingly.

Article 68. TESTS AND INSPECTIONS

- a. If the Contract Documents, the District Representative, or any instructions, laws, ordinances, or public authority require any part of the Work to be tested or approved, Contractor shall provide the District Representative at least two (2) working days' notice of its readiness for observation or inspection. If inspection is by a public authority other than the District, Contractor shall promptly inform the District of the date fixed for such inspection. Required certificates of inspection (or similar) shall be secured by Contractor. Costs for District testing and District inspection shall be paid by the District. Costs of tests for Work found not to be in compliance shall be paid by the Contractor.
- b. If any Work is done or covered up without the required testing or approval, the Contractor shall uncover or deconstruct the Work, and the Work shall be redone after completion of the testing at the Contractor's cost in compliance with the Contract Documents.
- c. Where inspection and testing are to be conducted by an independent laboratory or agency, materials or samples of materials to be inspected or tested shall be selected by such laboratory or agency, or by the District, and not by Contractor. All tests or inspections of materials shall be made in accordance with the commonly recognized standards of national organizations.
- d. In advance of the manufacturing of materials to be supplied by Contractor which must be tested or inspected, Contractor shall notify the District so that the District may arrange for testing at the source of supply. Any materials which have not satisfactorily passed such testing and inspection shall not be incorporated into the Work.
- e. If the manufacturing of materials to be inspected or tested will occur in a plant or location outside the geographic limits of District, the Contractor shall pay for any excessive or unusual costs associated with such testing or inspection, including but not limited to excessive travel time, standby time and required lodging.
- f. Reexamination of the Work may be ordered by the District. If so ordered, the Work must be uncovered or deconstructed by Contractor. If the Work is found to be in accordance with the Contract Documents, the District shall pay the costs of reexamination and reconstruction. If such Work is found not to be in accordance with the Contract Documents, Contractor shall pay all costs.
- g. Inspection and testing by the District or its representatives shall not relieve the Contractor from complying with the requirements of the Contract Documents. The Contractor is responsible for its own quality control.

Article 69. SOILS INVESTIGATION REPORT

- a. Soil Report: Unless otherwise specifically provided, when a soils investigation report obtained from test holes at the site is available, such report shall not be a part of this Contract. Nevertheless, with respect to any such soils investigation and/or geotechnical report regarding

the site, it shall be the responsibility of the Contractor to review and be familiar with such report. Any information obtained from such report or any information given on drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only, is not guaranteed, and does not form a part of the Contract, unless otherwise specifically provided.

- b. Underground Investigation: Contractor is required to make a visual examination of site and must make whatever tests he deems appropriate to determine the underground condition of the soil. Limited soil tests and subsurface investigations, if any, are available for review and consideration by Contractor and were conducted for the purpose of design only. Subsurface investigation information is made available by District solely as a matter of convenience and general information for Contractor and Contractor is expected to review and be familiar with such information. No representation is made by the District or its representatives that information provided is completely representative of all conditions and materials which may be encountered. If such a report is referenced in the Contract Documents for performance of the Work, such reference shall be to establish minimum requirements only.
- c. No Representations: No representation is made by the District or its representatives that information provided is solely adequate for purposes of construction. District disclaims responsibility for interpretations by Contractor of soil and subsurface investigation information, such as in protecting soil-bearing values, rock profiles, presence and scope of boulders and cobbles, soil stability and the presence, level and extent of underground water. Contractor shall determine the means, methods, techniques and sequences necessary to achieve required characteristics of completed Work. Conditions found after execution of the Agreement to be materially different from those reported and which are not customarily encountered in the geographic area of the Work shall be governed by provisions of the General Conditions of the Contract for unforeseen conditions.

Article 70. DISTRICT'S STATUS

- a. In general and where appropriate and applicable, the District's Director of Facilities, shall be the District's representative during the construction period and shall observe the progress and quality of the Work on behalf of the District. He or she shall have the authority to act on behalf of District only to the extent expressly provided in the Contract Documents. After consultation with the Inspector and after using his best efforts to consult with the District, the District shall have authority to stop work whenever such stoppage may be necessary in his reasonable opinion to insure the proper execution of the Contract Documents.
- b. Contractor further acknowledges that the District shall be, in the first instance, the judge of the performance of this Contract.

Article 71. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party, the Contract shall forthwith be physically amended to make such insertion or correction.

Article 72. LABOR/EMPLOYMENT SAFETY

The Contractor shall maintain emergency first aid treatment for his employees which complies with the Federal Occupational Safety and Health Act of 1970 (29 USC, section 651 et seq.) and associated regulations.

Article 73. ASSIGNMENT OF ANTITRUST ACTIONS

Pursuant to Public Contract Code Section 7103.5, in entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the District all rights, title, and interest in and to all causes of action it may have under section 4 of the Clayton Act (15 USC, section 15) or under the Cartwright Act (chapter 2 (commencing with section 16700) of part 2 of division 7 of the Business and Professions Code), arising from the purchase of goods, services, or materials pursuant to this Contract 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.

Article 74. SUBSTITUTION OF SECURITY

- a. Upon the Contractor's request, the District will make payment of funds withheld from progress payments to ensure performance under the Contract pursuant to the requirements of Public Contract Code section 22300 if the Contractor deposits in escrow with the District or with a bank acceptable to the District, securities eligible for investment under Government Code section 16430, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or other security mutually agreed to by the Contractor and the District, subject to the following conditions:
1. The Contractor shall bear the expense of the District and the escrow agent, either the District or the bank, in connection with the escrow deposit made.
 2. Securities or certificates of deposit to be placed in escrow shall be of a value at least equivalent to the amounts of retention to be paid to the Contractor pursuant to this section.
 3. The Contractor shall enter into an escrow agreement satisfactory to the District, which agreement shall include provisions governing inter alia:
 - (a) The amount of securities to be deposited,
 - (b) The providing of powers of attorney or other documents necessary for the transfer of the securities to be deposited,
 - (c) Conversion to cash to provide funds to meet defaults by the Contractor, including, but not limited to, termination of the Contractor's control over the work, stop payment notices filed pursuant to law, assessment of liquidated damages or other amounts to be kept or retained under the provisions of the contract,
 - (d) Decrease in value of securities on deposit,
 - (e) The termination of the escrow upon completion of the contract.
 4. The Contractor shall obtain the written consent of the surety to such agreement.

5. As an alternative to Contractor depositing into escrow securities of a value equivalent to the amounts of retention to be paid to the Contractor, upon Contractor's request, District will make payment of retentions earned directly to the escrow agent at the expense of Contractor pursuant to and in accordance with Public Contract Code section 22300.

Article 75. COMPLIANCE WITH STATE STORM WATER PERMIT FOR CONSTRUCTION

- a. The Contractor shall be required to comply with all conditions of the State Water Resources Control Board (State Water Board) National Pollutant Discharge Elimination System General Permit for Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity (Permit) for all construction activity which results in the disturbance of in excess of one acre of total land area or which is part of a larger common area of development or sale. The Contractor shall be responsible for filing the Notice of Intent and for obtaining the Permit. The Contractor shall be solely responsible for preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP) prior to initiating Work. It shall be Contractor's responsibility to evaluate the cost of compliance with the SWPPP in bidding on this Contract. Contractor shall comply with all requirements of the State Water Resources Control Board. Contractor shall include all costs of compliance with specified requirements in the Contract amount.
- b. Contractor shall be responsible for implementing and complying with the provisions of the Permit and the SWPPP, including the standard provisions, monitoring and reporting requirements as required by the Permit. Contractor shall provide copies of all reports and monitoring information to the District.
- c. Contractor shall comply with the lawful requirements of any applicable municipality, the County, drainage district, and other local agencies regarding discharges of storm water to separate storm drain system or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs.
- d. Failure to comply with the Permit is a violation of federal and state law. Contractor hereby agrees to indemnify and hold harmless the District, its Board members, officers, agents, employees and authorized volunteers from and against any and all claims, demands, losses or liabilities of any kind or nature which District, its Board members, officers, agents, employees and authorized volunteers may sustain or incur for noncompliance with the Permit arising out of or in connection with the Project, except for liability resulting from the negligence or willful misconduct of the District, its Board members, officers, agents, employees or authorized volunteers. District may seek damages from Contractor for delay in completing the Contract in accordance with Article 77 hereof, caused by Contractor's failure to comply with the Permit.

Article 76. RECORD KEEPING

- a. The Contractor agrees to comply with Labor Code §§ 1776 and 1812. The Contractor and each Subcontractor shall keep or cause to be kept an accurate record showing the names, addresses, social security numbers, work classifications, straight time and overtime hours worked each day and week of all workers employed by Contractor in connection with the execution of this Contract or any subcontract thereunder and showing the actual per diem wages paid to each of such workers. These records shall be certified; shall be submitted electronically at least monthly to the Chief of the Division of Labor Standards Enforcement of the Department of Industrial Relations; and shall be open at all reasonable hours to the inspection of the District awarding the Contract, its officers and agents, and to the Chief of the Division of Labor Standards Enforcement of the Department of Industrial Relations, and his or her other deputies and agents.

- b. In addition, copies of the above records shall be available as follows:
- 1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request;
 - 2) A certified copy of all payroll records 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;
 - 3) A certified copy of all payroll records shall be made available upon request by 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 previously provided, the requesting party shall, prior to being provided the records, reimburse the costs of the Contractor, Subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the Contractor.
- c. The Contractor shall file a certified copy of the records with the entity requesting the records within ten days after receipt of a written request. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the District, 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 awarded the Contract or performing the Contract shall not be marked or obliterated. A copy of records made available to a Taft-Hartley trust fund or a joint labor-management committee is shall be made available according to the provisions of Labor Code § 1776(e).
- d. The Contractor shall inform the District of the location of the records, including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.
- e. In the event of noncompliance with the requirements of this section, the Contractor shall have ten days in which to comply subsequent to receipt of written notice specifying in what respects the Contractor must comply with this section. Should noncompliance still be evident after the ten day period, the Contractor shall, as a penalty to the District, forfeit one hundred dollars (\$100) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due.
- f. Responsibility for compliance with this provision shall be with the Contractor.

Article 77. PROJECT COMPLETION

- a. When all of the work to be performed under this Contract has been fully completed, the Contractor shall notify the Architect and District, in writing, setting a date for inspection. The Contractor and Subcontractor representatives shall attend the inspection. As a result of this inspection, the Architect will prepare a list of items ("punch list") that are incomplete or not installed according to the Contract Documents. Failure to include items on this list does not relieve the Contractor from fulfilling all requirements of the Contract Documents.
- b. The Architect will promptly deliver the punch list to the Contractor and it will include a period of time by which the Contractor shall complete all items listed thereon. On completion of all items on the punch list, verified by a final inspection, and all other Contract requirements, so that Final

Completion has been achieved to the District's satisfaction, the District will file a Notice of Completion with the County Recorder. Payment of retention from the Contract, less any sums withheld pursuant to the terms of this Contract or applicable law, shall not be made sooner than thirty-five (35) calendar days after the date of filing of Notice of Completion. Contractor shall perform all tasks necessary to obtain Project certification from the authority having jurisdiction over the Project. Final Completion shall not occur until Contractor has delivered evidence of final Project certification to the District.

- c. District reserves the right to occupy buildings and/or portions of the site at any time before Final Completion, and occupancy shall not constitute final acceptance of any part of the Work covered by the Contract Documents, nor shall such occupancy extend the date specified for completion of the Work. Beneficial occupancy of building(s) does not commence any warranty period or entitle Contractor to any additional compensation due to such occupancy, or affect in any way or amount Contractor's obligation to pay liquidated damages for failure to complete the Project on time.

Article 78. DISPUTE RESOLUTION

- a. 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.
- b. Dispute/Claims Resolution.
 - 1. Contractor Continuation of Work. Notwithstanding any claim, dispute, disagreement or other matter in controversy between the District and the Contractor relating to the Contract Documents and/or the Work, the Contractor shall continue to diligently prosecute and perform the Work in accordance with requirements of the Contract Documents, pending any final determination or decision regarding any such claim, dispute, disagreement or matter in controversy.
 - 2. Public Contract Code § 9204 Claims Resolution Procedures. Claims of the Contractor are subject to the non-binding dispute resolution procedures set forth in Public Contract Code § 9204 ("Section 9204") provided, however, that the Contractor's initiation of Section 9204 procedures is expressly subject to the Contractor's prior full and timely compliance with requirements and procedures of the Contract Documents relating to procedures for resolution of claims, change orders, disputes and other matters in controversy under the Contract Documents.
 - 3. Claim Defined. The term "Claim" shall be as defined in Section 9204.
 - 4. Claim Documentation. The Contractor shall furnish reasonable documentation to support each Claim. "Reasonable documentation" includes, without limitation: (i) contractual and legal basis establishing Claim entitlement or merit; (ii) factual basis establishing District liability for the Claim; (iii) detailed breakdown of labor, materials, equipment and other costs included in the Claim; and (iv) detailed basis, including Construction Schedule analysis and fragnets supporting any Contract Time adjustment or Liquidated Damages relief included in the scope of a Claim.
 - 5. District Claim Review Statement. Within forty-five (45) days (or such other time mutually agreed to by the District and the Contractor) after receipt of a properly submitted and properly documented Claim, the District will conduct a reasonable

review of the Claim and provide the Contractor with a written statement identifying the disputed and undisputed portions of the Claim (“Claim Review Statement”). If the District does not provide the Contractor with the Claim Review Statement for any Claim within forty-five (45) days (or other time mutually agreed to by the District and the Contractor) after receipt of a properly submitted and properly documented Claim, the Claim is deemed rejected in its entirety and thereupon, the Contractor may initiate the Meet and Confer process described below. A Claim deemed rejected pursuant to the foregoing does not constitute an adverse finding of Claim merit or the Contractor’s responsibility or qualifications. If the Claim Review Statement identifies any undisputed portion of a Claim (“Undisputed Claim”) and payment is due from the District on the Undisputed Claim, the District shall process and make payment on the Undisputed Claim within sixty (60) days after the issuance date of the Claim Review Statement.

6. Meet and Confer.

(a) Meet and Confer Demand. If the Contractor disputes any portion of the Claim Review Statement, or if a Claim is deemed rejected by the District not providing the Contractor with the Claim Review Statement within the time permitted under Section 9204, the Contractor may demand an informal conference to meet and confer with the District for settlement of the issues in dispute (“Meet and Confer”). The Contractor’s Meet and Confer request must be submitted to the District: (i) in writing; (ii) by registered mail or certified mail, return receipt requested; and (iii) within ten (10) days after the Claim Review Statement is submitted to the Contractor or within ten (10) days after the date the Claim is deemed rejected, as applicable. Failure of the Contractor to strictly comply with the foregoing is deemed a waiver of the Contractor’s right to request the Meet and Confer and the Non-Binding Mediation procedures under Section 9204. If the Contractor strictly complies with the foregoing, the District will schedule the Meet and Confer conference within thirty (30) days of the Contractor’s Meet and Confer request for settlement of disputed portions of the Claim Review Statement.

(b) Meet and Confer Statement. Within ten (10) business days after conclusion of the Meet and Confer conference, if any portion of a Claim remains disputed, the District shall provide the Contractor a written statement identifying the disputed and undisputed portions of the Claim (“Meet and Confer Statement”). If the Meet and Confer Statement identifies any Undisputed Claim and payment is due from the District on the Undisputed Claim, the District shall process and make payment on the Undisputed Claim within sixty (60) days after date the Meet and Confer Statement is issued.

7. Non-Binding Mediation.

(a) Contractor Initiation. The Contractor may request nonbinding mediation (“Mediation”) of disputed portions of a Claim identified in the Meet and Confer Statement. The Contractor’s Mediation demand must be submitted to the District: (i) in writing; (ii) by registered mail or certified mail, return receipt requested; (iii) within ten (10) days after the Meet and Confer Statement is submitted to the Contractor; and (iv) with specific identification of the disputed Claims issues subject to Mediation. Failure of the Contractor to strictly comply with the foregoing is deemed a waiver of the Contractor’s right to demand Mediation procedures under Section 9204.

(b) Mediator Selection. The District and Contractor shall mutually agree to a mediator within ten (10) business days after the date of the Contractor's demand for Mediation. If the District and Contractor do not mutually agree to a mediator, the District and Contractor shall each select a mediator and the District/Contractor selected mediators shall select a qualified neutral third party to mediate the disputed portion of the Claim.

(c) Mediation Procedures. Mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the District and Contractor in dispute resolution through negotiation or by issuance of an evaluation.

(d) Mediation Costs. All costs, fees and expenses of the mediator(s) and mediation administration shall be shared equally by the District and Contractor. The foregoing notwithstanding, the Contractor and District shall each bear the costs, fees and expenses of their own attorneys, experts and consultants.

(e) Post-Mediation Disputed Claims. Any Claims or issues in dispute after Mediation shall be resolved in accordance with the applicable provisions of the Contract Documents.

(f) Waiver. The District and Contractor may mutually agree to waive, in writing, Mediation under Section 9204 and, subject to the Contractor's compliance with Government Code Claim requirements, proceed directly to commencement of a civil action or binding arbitration.

8) Payments of Undisputed Claims. If a payment due from the District for Undisputed Claims identified in the Claim Review Statement or the Meet and Confer Statement issued for a Claim is not made within the time established under Section 9204 the overdue portion of such payment shall bear interest at the rate of seven percent (7%) per annum from the date due. The District's credit application of any amount due for an Undisputed Claim against amounts due from the Contractor under the Contract Documents shall be deemed payment of the Undisputed Claim.

9) Subcontractor Claims.

(a) Subcontractor Claim Submittal. If a Subcontractor, of any tier (collectively referred to as "Subcontractor" in this Article) lacks legal standing to assert a Claim against the District because privity of contract does not exist, the Contractor may present the District a Claim on behalf of the Subcontractor ("Subcontractor Claim"). Each Subcontractor requesting submittal of a Subcontractor Claim to the District shall furnish reasonable documentation to support the Subcontractor Claim. Within forty-five (45) days of receipt of a Subcontractor's written request to submit a Subcontractor Claim, the Contractor shall notify the Subcontractor in writing as to whether the Contractor presented the Subcontractor Claim to the District. If the Contractor did not present the Subcontractor Claim, the Contractor shall provide the Subcontractor with a statement of the reasons for not having done so.

(b) Contractor Certification of Subcontractor Claim. The District's review of Subcontractor Claims is expressly subject to the Contractor's submittal of a duly completed and executed form of Contractor Certification

of Subcontractor Claim certifying that the Contractor has thoroughly reviewed the Subcontractor Claim and based on the Contractor's review, certify that: (i) the Subcontractor Claim is made by the Subcontractor in good faith; (ii) the Subcontractor Claim is supported by reasonable documentation establishing entitlement to the relief requested and District liability therefor; and (iii) the Subcontractor Claim does not incorporate any request constituting a False Claim under applicable law, including the California False Claim Act (Government Code § 12650 *et seq.*). The form of Contractor Certification of Subcontractor Claim is included in the Contract Documents.

c. District Review of Subcontractor Claim. Subcontractor Claims presented by the Contractor to the District are subject to the Section 9204 non-binding dispute resolution procedures set forth above, as modified herein. Requests for the District to conduct Meet and Confer and/or non-binding mediation procedures must be submitted jointly by the Contractor and the Subcontractor submitting the Subcontractor Claim. If Mediation proceedings are initiated in connection with a Subcontractor Claim, mediator and mediation administration fees and costs shall be borne equally by the District, Contractor and Subcontractor.

d. Disputed Subcontractor Claims. Subcontractor Claims which are not fully resolved by the Section 9204 non-binding dispute resolution procedures shall be resolved by Public Contract Code Section 20104.4 Dispute Resolution Procedures or binding arbitration, as applicable. Commencement of Section 20104.4 Dispute Resolution Procedures or binding arbitration proceedings in connection with any Subcontractor Claim is subject to compliance with Government Code Claims requirements.

10) Government Code Claim Requirements. Pursuant to Government Code § 930.6, any claim, demand, dispute, disagreement or other matter in controversy asserted by the Contractor, whether on behalf of itself or a Subcontractor, against the District for money or damages, including without limitation Claims or portions thereof remaining in dispute after completion of the Section 9204 non-binding dispute resolution procedures described above are deemed a "suit for money or damages" and shall be subject to the provisions of Government Code §§ 945.4, 945.6 and 946 ("Government Code Claims Process"). An express condition precedent to the Contractor's initiation of Section 20104.4 Dispute Resolution Procedures or binding arbitration proceedings pursuant to the following is the Contractor's compliance with the Government Code Claims Process, including without limitation, presentation of the claim, demand, dispute, disagreement or other matter in controversy between the Contractor and the District seeking money or damages to the District and acted upon or deemed rejected by the District in accordance with Government Code § 900 *et seq.*

c. Binding Arbitration of Claims.

1) JAMS Arbitration. Any Claim, or portion thereof in dispute after completion of the Section 9204 procedures and the Government Code Claims Process and any other claims, disputes, disagreements or other matters in controversy between the District and the Contractor arising out of, or related, in any manner, to the Contract Documents, or the interpretation, clarification or enforcement thereof shall be resolved by binding arbitration conducted before one (1) retired judge in accordance with the Construction Arbitration Rules and Procedures of Judicial Arbitration Mediation Services ("JAMS") in effect as of the date that a Demand for Arbitration is filed, except as expressly modified herein or

otherwise agreed to by the parties. The locale for any arbitration commenced hereunder shall be the regional office of the JAMS closest to the Site.

2) Demand for Arbitration. A Demand for Arbitration shall be filed and served within a reasonable time after the occurrence of the claim, dispute or other disagreement giving rise to the Demand for Arbitration, but in no event shall a Demand for Arbitration be filed or served after the date when the institution of legal or equitable proceedings based upon such claim, dispute or other disagreement would be barred by the applicable statute of limitations. If more than one Demand for Arbitration is filed by either the District or the Contractor relating to the Work or the Contract Documents, all Demands for Arbitration shall be consolidated into a single arbitration proceeding, unless otherwise agreed to by the District and the Contractor. At the District's request, the Contractor's Surety, a Subcontractor or Material Supplier to the Contractor and other third parties may be permitted to join in and be bound by an arbitration commenced hereunder if required by the terms of their respective agreements with the District and/or Contractor, or otherwise agreed to by the involved third parties.

3) Discovery. In connection with any arbitration proceeding commenced hereunder, the discovery rights and procedures provided for in California Code of Civil Procedure § 1283.05 shall be applicable, and the same shall be deemed incorporated herein by this reference.

4) Arbitration Award. The award rendered by the Arbitrator ("Arbitration Award") shall be final and binding upon the District and the Contractor only if the Arbitration Award is: (i) supported by substantial evidence; (ii) based on applicable legal standards in effect at the time the Arbitration Award is issued; and (iii) supported by written findings of fact and conclusions of law in conformity with California Code of Civil Procedure § 1296. Any Arbitration Award that does not conform to the foregoing is invalid and unenforceable. The District and Contractor hereby expressly agree that the Court shall, subject to California Code of Civil Procedure §§ 1286.4 and 1296, vacate the Arbitration Award if, after review, the Court determines that the Arbitration Award does not fully conform to the foregoing. The confirmation, enforcement, vacation or correction of an arbitration award rendered hereunder shall be made by the Superior Court of the State of California for the county in which the Site is situated. The substantive and procedural rules for such post-award proceedings shall be as set forth in California Code of Civil Procedure § 1285 et seq.

5) Arbitration Fees and Expenses. The expenses and fees of the Arbitrator shall be divided equally among all of the parties to the arbitration. Each party to any arbitration commenced hereunder, or any other action, shall be responsible for and shall bear its own attorneys' fees, witness fees and other costs or expenses incurred in connection with such arbitration. The foregoing notwithstanding, the Arbitrator may award arbitration costs, including Arbitrator's fees but excluding attorneys' fees, to the prevailing party. By this arbitration provision, the District and the Contractor acknowledge and agree that neither shall recover from the other any attorney's fees 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. The limited exceptions in the Contract Documents that provide attorney's fees for specific issues shall neither be construed as applying to this arbitration provision under California Civil Code § 1717(a) nor be deemed to be "authorized by the Laws."

6) Inapplicability to Bid Bond. The arbitration proceedings described above are not applicable to disputes, disagreements or enforcement of rights or obligations under the Bid Bond. All claims, disputes and actions to enforce rights or obligations under the Bid Bond shall be adjudicated only by judicial proceedings commenced in a court of competent jurisdiction.

Article 79. FORCE MAJEURE

Neither party will be liable to the other for unanticipated delays or failures in performance resulting from causes beyond the reasonable control of that party, including but not limited to, acts of God, labor disputes or disturbances, material shortages or rationing, riots, acts of war, governmental regulations, communications or utility failures, casualties, pandemics, epidemics, or quarantines; provided that the delayed party: (i) gives the other party prompt written notice of such cause, (ii) uses its reasonable efforts to correct such failure or delay in its performance, and (iii) resumes performance as soon as reasonably practicable. Any and all delays resulting from a force majeure event, as specified herein, will only be classified as excusable, non-compensable delays.

Article 80. COMPLIANCE WITH DTSC GUIDELINES – IMPORTED SOILS

If the project requires the use of imported soils, the Contractor shall be responsible to use and shall certify that the imported material it uses is free of any hazardous and/or toxic substance or material of any nature or type as defined in accordance with California Law and the California Health and Safety Code. The District reserves the right to reject any imported material that has come from agricultural or commercial land uses. Contractor must notify the District of the source of material and comply with the applicable Regional Water Quality Control Board Resolutions and when applicable, with the guidelines of the Department of Toxic Substances Control (“DTSC”).

Article 81. FINGERPRINTING

District Determination of Fingerprinting Requirement Application

The District has considered the totality of the circumstances concerning the Project and has determined that the Contractor and Contractor’s employees (which includes Subcontractor employees):

 X are subject to the requirements of Education Code § 45125.2 and Paragraph (a) below, is applicable.

 are not subject to the requirements of Education Code § 45125.2, and Paragraph (b) below, is applicable.

- a. Contracts for Construction, Reconstruction, Rehabilitation, or Repair of a School Facility Involving More than Limited Contact with Students (§ 45125.2)

By execution of the Contract, the Contractor acknowledges that Contractor is entering into a contract for the construction, reconstruction, rehabilitation, or repair of a school facility where the Contractor and/or Contractor’s employees will have more than limited contact with students and the services to be provided do not constitute an emergency or exceptional situation. In accordance with Education Code § 45125.2 the Contractor shall, at Contractor’s own expense, (1) install a physical barrier to limit contact with students by Contractor and/or Contractor’s employees, and/or (2) provide for the continuous supervision and monitoring of the Contractor and/or Contractor’s employees by an employee of the Contractor who has received fingerprint clearance from the California Department of Justice, and/or (3) provide for the surveillance of the Contractor and Contractor’s employees by a District employee.

- b. Contracts for Construction, Reconstruction, Rehabilitation or Repair of a School Facility Involving Only Limited Contact With Students (§ 45125.2)

By execution of the Contract, the Contractor acknowledges that Contractor is entering into a

contract for the construction, reconstruction, rehabilitation or repair of a school facility involving only limited contact with students. Accordingly, the parties agree that the following conditions apply to any work performed by the Contractor and Contractor's employees on a school site: (1) Contractor and Contractor's employees shall check in with the school office each day immediately upon arriving at the school site; (2) Contractor and Contractor's employees shall inform school office staff of their proposed activities and location at the school site; (3) Once at such location, Contractor and Contractor's employees shall not change locations without contacting the school office; (4) Contractor and Contractor's employees shall not use student restroom facilities; and (5) If Contractor and/or Contractor's employees find themselves alone with a student, Contractor and Contractor's employees shall immediately contact the school office and request that a member of the school staff be assigned to the work location.

Article 82. LABOR COMPLIANCE MONITORING

The project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations. In accordance with Labor Code § 1771.1, all bidders, contractors and subcontractors working at the site shall be duly registered with the Department of Industrial Relations at time of bid opening and at all relevant times. Proof of registration shall be provided as to all such contractors prior to the commencement of any work. Contractor shall coordinate with the Architect to ensure the Department of Industrial Relations is advised of the award of the construction contract in a timely manner by filing form PWC-100 with the Department of Industrial Relations after award of the contract.

Article 83. DRUGS, TOBACCO, ALCOHOL, ANIMALS

The Contractor shall prohibit and take all steps necessary to ensure that its and its subcontractors' employees do not possess, consume, or work under the influence of any alcohol, tobacco or illegal drugs while on the Project site. The Contractor shall take all necessary steps to ensure that its and its subcontractor's employees comply with all applicable District policies and directives relating to appearance and behavior on school sites and/or District property. The Contractor shall prohibit and prevent its employees and subcontractor's employees from bringing any animal onto the Project.

Article 84. NO DISCRIMINATION

It is the policy of the District that, in connection with all work performed under this public works contract, there shall be no discrimination against any prospective or active employee or any other person engaged in the work because of actual or perceived race, religious creed, color, national origin, ancestry, physical or mental disability, medical condition, genetic information, marital status, sex, age, sexual orientation, reproductive health decisionmaking, or veteran or military status. The Contractor agrees to comply with applicable Federal and California laws including, but not limited to, the California Fair Employment Practice Act, beginning with Government Code § 12900, Government Code § 11135, and Labor Code §§ 1735, 1777.5, 1777.6 and 3077.5. In addition, the Contractor agrees to require like compliance by all Subcontractors and suppliers.

Article 85. GENERAL PROVISIONS

a. Assignment and Successors:

Neither party may transfer or assign its rights or obligations under the Contract Documents, in part or in whole, without the other party's prior written consent. The Contract Documents are binding on the heirs, successors, and permitted assigns of the parties hereto.

b. Third Party Beneficiaries:

There are no intended third party beneficiaries to the Contract.

c. Choice of Law and Venue:

The Contract Documents shall be governed by California law, and venue shall be in the Superior Court of the county in which the project is located, and no other place.

d. Severability:

If any provision of the Contract Documents is determined to be illegal, invalid, or unenforceable, in part or in whole, the remaining provisions, or portions of the Contract Documents shall remain in full force and effect.

e. Entire Agreement

The Contract Documents constitute the final, complete, and exclusive statement of the terms of the agreement between the parties regarding the subject matter of the Contract Documents and supersedes all prior written or oral understandings or agreements of the parties.

f. Waiver:

No waiver of a breach, failure of any condition, or any right or remedy contained in or granted by the provisions of the Contract Documents shall be effective unless it is in writing and signed by the party waiving the breach, failure, right, or remedy. No waiver of any breach, failure, right, or remedy shall be deemed a waiver of any other breach, failure, right, or remedy, whether or not similar, nor shall any waiver constitute a continuing waiver unless the writing so specifies.

g. Headings

The headings in the Contract Documents are included for convenience only and shall neither affect the construction or interpretation of any provision in the Contract Documents nor affect any of the rights or obligations of the parties to the Contract.

h. 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, the Project or the Contract Documents, including but not limited to all applicable federal, state, local, and District policies, procedures, regulations and guidelines related to COVID-19, or any other pandemic or epidemic.

DISABLED VETERANS PARTICIPATION GOALS

In accordance with Education Code § 17076.11, this District has a participation goal for disabled veteran business enterprises (“DVBE”) of at least 3 percent (3%) per year of the overall dollar amount of funds allocated to the District by the State Allocation Board pursuant to the Leroy F. Greene School Facilities Act of 1998 for construction or modernization and expended each year by the District. Prior to, and as a condition precedent for final payment under any contract for such project, the Contractor shall provide appropriate documentation to the District identifying the amount paid to DVBE in conjunction with the Contract, so that the District can assess its success at meeting this goal.

RETENTION OF DVBE RECORDS

The Contractor agrees that, for all contracts subject to DVBE participation goals, the State and the District have the right to review, obtain and copy all records pertaining to performance of the contract in accordance with DVBE requirements. The Contractor agrees to provide the State or the District with any relevant information requested and shall permit the State or District access to its premises upon reasonable notice for purposes of interviewing employees and inspecting records. The Contractor agrees to maintain such records for a period of three years after final payment under the Contract.

[END OF GENERAL CONDITIONS DOCUMENT]

SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's New Gymnasium Project

BID No. 20240270-01

**SECTION 8
SPECIAL CONDITIONS**

SPECIAL CONDITIONS

1. **Contract Time.** The Work shall be commenced on the date stated in the District's Notice to Contractor to Proceed and shall be substantially completed within 274 calendar days from the District's Notice to Proceed.
2. **Liquidated Damages:** The Contractor shall be subject to the following liquidated damages (reference Article 19 of the General Conditions):
 - a. **Liquidated Damages – Time of Completion:** If work under this Contract is not at Substantial Completion within the specified time period, the agreed liquidated damages established in the General Conditions is **(\$1,000.00) per day** for each calendar date Substantial Completion is delayed.
3. **Drawings and Specifications.** The number of sets of the Drawings and Specifications, which the District will provide to the awarded Contractor, pursuant to Article 3 of the General Conditions, is two (2) sets of specifications with plans to Contractor and one (1) electronic copy for Contractor to make copies for distribution to each listed Subcontractor. The Contractor may procure additional sets of Contract Documents at their discretion. The cost for additional copies of the Contract Documents shall be the Contractor's responsibility to pay.

Awarded Contractor may secure bid documents from **AI PlanRoom @ www.aandiplanroom.com**. Bid documents are available from A&I Reprographics by creating an account and logging on to: www.aandiplanroom.com or by calling 909-514-0704 or by email: bid@aandirepro.com. There is a non-refundable fee for obtaining a printed set of documents or a digital download. Any changes via addenda will be available on the A&I Reprographics site at www.aandiplanroom.com.

4. **Insurance.**
 - a. **Contractor's Insurance.** See Article 31 of the General Conditions.
 - b. **Builders' Risk Insurance.** In accordance with Article 31 of the General Conditions, coverage shall be provided for the full insurable value of the Work. Coverage for the perils of earthquakes is to be included within the scope of coverage under the builder's risk insurance policy.
 - c. **Certificates of Insurance.** Certificates of insurance shall clearly state that the District is named as an additional insured under the policy described and that such insurance policy shall be primary to any insurance or self-insurance maintained by the District.
5. **Number of Contract Documents.** The number of original executed copies of the Agreement is two (2), the number of original performance bonds and payment bonds. Projects over \$25,000.00 required is two (2).
6. **Working Hours. Working hours shall be as follows:**

Work hours are subject to standard construction hours per the noise ordinance set by the County of San Bernardino. Contractor is expected to work weekends, evenings and holidays, as necessary, to complete the Work within the specified time of completion without any additional cost to the District. (Reference General Conditions Article 30).

The working hours for this Contract beginning on the date of Notice to Proceed are 6a.m. to 11p.m. Monday through Saturday thru date of substantial completion.

Notice to Contractor:

Upon submission of bid, Contractor agrees to commit and comply with and is fully aware that the Project will require a work force sufficient to complete the Project on time according to the Contract Documents related to meeting the Project close out date per the Project schedule issued by the District.

Bidding/awarded Contractor shall include all costs in their bid for any and all overtime and weekend work required along with any requirement for any increased manpower or workforce to complete the Project on time. No additional costs will be accepted by the District for overtime or weekend work or an increased workforce to complete the Project on time in accordance with the Project schedule issued by the District. Bidding/awarded Contractor agrees upon submission of bid/award to refund to the District a credit/cost of two thousand dollars (\$2,000.00) for each Saturday the Contractor does not have a **full and complete working crew including management** onsite completing the Work to meet the Project schedule issued by the District. (Project close out)

No Sunday Work shall be allowed unless approved by the District forty-eight (48) hours in advance. Work considered noisy, *i.e.*, jack hammering, shall be done on weekends, holidays or after school hours (after 3 p.m.) or during school holidays. **Jack hammering work shall not begin before 8 a.m. and must cease at 7 p.m.**

Contractor shall fence off and separate work force from students or faculty during all construction operations and set up safe zones for areas that have accident exposure conditions where any work of any kind is being performed that may have the ability to cause injury to the students, faculty or general public. No Exceptions.

ALL WORKERS WHO ENTER ANY PROPERTY WITH IN THE DISTRICT SHALL SIGN IN AT THE ADMINISTRATION OFFICE FOR THAT SCHOOL SITE OR WITH THE PRIME CONTRACTOR UPON ENTERING OR EXITING THE SCHOOL SITE. EACH CONTRACTOR OR THEIR SUBCONTRACTORS/SUPPLIERS/DELIVERY PERSONNEL SHALL WEAR AT ALL TIMES, AN IDENTIFICATION BADGE AND HIGH VISIBILITY VEST TO BE EASILY IDENTIFIED BY THE DISTRICT. THIS REQUIREMENT IS MANDATORY!

7. **Security.** In addition to the security requirements set forth elsewhere in the Contract Documents, the Contractor must adhere to the following:
- a. **Use of Site Key.** 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.
 - b. **Keys.** The District shall provide a key for access into spaces affected by the scope of Work of the Project. The Contractor shall provide a key deposit in the form of a cashier's check, which will be returned upon the return of the keys to the District.
 - c. The Contractor's site supervisor for each work authorization will be issued a key for that Site at the beginning of the Work. The key must not be duplicated, and the Contractor is responsible for returning the key to the District when the Work at the Site is completed.

- d. **Project Site Security and Locked Door Policy.** No Site, or building or room on the Site, shall be left unsecured for any period of time when not occupied by the Contractor.
- e. **Gates.** The contractor shall “double lock” access gates necessary to gain access to the project area as approved by the District’s representative.

8. Mark-ups on Changes to the Work. In the event of Changes to the Work, pursuant to Article 47 of the General Conditions, the mark-up for Contractor’s plus Subcontractor’s overhead (including home and field office overhead), general conditions costs and profit, shall not exceed twenty-seven percent (27%) of the direct actual costs for performance of the Change, as determined in accordance with the provisions of Article 47 of the General Conditions. 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 of no greater than one percent (1%) of the actual direct costs for performance of the Change and the maximum allowable mark- up for overhead, general conditions and profit. Contractor may add an insurance premium fee of no greater than one percent (1%) of the actual direct costs for performance of the Change and the maximum allowable mark-up for overhead, general conditions and profit.

Mark-ups on Change Orders

Net Amount of Each Change Order	Various Types of Change Orders	Combined Contractor and Subcontractor’s	
		Overhead & Profit (OH&P)	Bond
Amount > 0	Entire Change Order Additive and Subcontractor performs the Work	15%	1%
	Net Result of Change Order Additive and Subcontractor performs the Work	10% sub 5% GC	
Amount > 0	Entire Change Order Additive and Contractor performs the Work	10%	1%
	Net Result of Change Order Additive and Contractor performs the Work		
Amount < 0	Entire Change Order is Deductive.	None Deducted	1%

9. Allowances

The following allowances are in addition to the scope of the Work as defined in the Contract Documents and the Contractor shall add all allowances to complete the Work and shall include the total Allowances amount in the bid lump sum amount (**Refer to Bid Form**).

List of Allowances

Item	Description	Amount (\$)
1		None
2		None
Total Allowances		None

The District may utilize the above allowances up to the total amount during the course of construction by issuing a Work order(s) to the Contractor. A deductive Change Order will be issued at the completion of

the Work to return the balance of the unused allowances to the District. Upon incorporation of the Work described in each Work order, the Contractor will be paid out of the allowance fund as a line item included in the Contractor's payment application.

10. **Catering Trucks.** No catering trucks may come within one hundred (100) yards of the campus while school is in session.
11. **Contractor's Superintendent Assigned to the Project.** The Contractor's Superintendent (i.e., project manager/foreman) shall not perform construction labor work. This prohibition is a requirement. The resume/work qualification of the Contractor's Superintendent must be submitted and approved by the District prior to the start of the Project. The Contractor shall not replace, reassign, or share the Contractor's Superintendent with any other projects until all Work has been completed to the satisfaction of the District. The District reserves the right after notification to deduct a cost from the Contract for the Contractor's Superintendent's absence on the Project/job site in the amount of one thousand five hundred dollars (\$1,500.00) per occurrence. (See Section 00100-Instructions to Bidders, Item #41.) The District also reserves the right to have the Contractor's Superintendent removed and replaced at its discretion due to the individual's lack of performance, knowledge or experience required of such position.
12. **Documents at Site. (REQUIRED).** The Contractor is to maintain a published copy of Title 24, Part 2 of the California Code of Regulations that applies to the Work of the Project. For Projects which include HVAC, the Contractor shall also maintain a published copy of the latest edition of Sheet Metal and Air Conditioning Contractors National Association Manual (SMACNA) requirements onsite at all times. All other building and other codes that are available through Internet access do not need to be onsite, if, and only if, the Contractor has an Internet connection available onsite. Contractor shall also have onsite at all times an "AS-BUILT SET OF CONTRACT DRAWINGS" showing all changes of any kind to the Contract Documents for review by the District, Architect, and Inspector of Record ("IOR"). Contractor will be required to continuously update the set of drawings each day showing any changes that have been made during the course of construction on the Project. Contractor, District, IOR, and Architect will review the "AS- BUILT SET OF CONTRACT DRAWINGS" prior to the approval of any monthly invoice or application for payment being processed. No monthly application for payment or invoice for Work shall be processed until the "AS-BUILT SET OF CONTRACT DRAWINGS" has been completely updated to the date of the Invoice or application for payment being submitted. There are no exceptions to these requirements.
13. **Lead Paint Removal.** The Contractor is to assume that all paint that needs to be removed during the construction of the Project contains lead. All remedial measures that need to be taken for lead-containing paint removal shall be included in the bid.
14. **Roofing.** Contractor shall take great care to not damage roof systems. Contractor shall notify the District immediately of any damage to roofs caused by the Contractor's operations so that repairs may be implemented immediately.
15. **District Representative.** **Robert Saffel** is the District Representative for the Project. All Project communications between the Contractor, the Architect, and the District shall be in writing and through **Frick Frick & Jette Architects, Rick Simper, rsimper@ffj-arch.com. CC: Robert Saffel, rsaffel@svusdk12.net.**
16. **Final Survey Certification.** Contractor shall provide, at no additional cost to the District, a final survey certification report for the Site. The survey shall certify all elevations noted on the civil and architectural plans for all newly-constructed work, and the locations for the site shut-off and building isolation valves. The survey results shall be incorporated into the redlined as-built drawings by the Contractor. If no

survey is performed by the Contractor, a credit for such costs for services shall be provided to the District by Contractor.

17. **Weather.** The Contractor shall include in its project schedule the impact of inclement weather on the Project. The Contractor will be granted non-compensable time extensions when the Project is delayed by rain beyond the number of rain days indicated below for a given month:
- a. November: 3 days
 - b. December: 3 days
 - c. January: 5 days
 - d. February: 7 days
 - e. March: 3 days

Mud days will also be granted as non-compensable if the Contractor can justify their impact on the critical path activities in the Project schedule.

18. **Overhead Expense Rate:** Upon the District's request, the Contractor shall submit a complete expense report to the District Representative.
19. **Daily Extra Work Sheets: (REQUIRED)** For any additional Work performed on a time-and-materials basis ("T&M"), Contractor must complete daily extra work sheets ("DEWS") and have signed by the District Representative on a daily basis. DEWS are to be submitted to the District Representative within twenty-four (24) hours of performance of the Work for review, acceptance and signatures. The District reserves the right to reject DEWS that are not submitted within the allotted time. In order not to delay the Work progress, resulting from unforeseen conditions associated with change order work, Contractor when directed in writing by the District Representative, shall proceed with the T & M work. The Contractor shall notify the IOR and District Representative before beginning, and again upon completion of any and all daily extra work and the end of that day in which the work related to the T & M was performed, Contractor shall obtain the signature of the District Representative on the DEWS within one (1) day (not later than twenty-four (24) hours) after each days extra work is performed. (MANDATORY/REQUIRED)
20. **Trenching Plan:** For Projects which include any trenching, within ten (10) days after the date specified in the Notice to Proceed, the Contractor must submit to the District Representative, a trenching plan indicating the exact location and routing of all trenches throughout the Site.
21. **Existing Shut-Off Valve Locations: (REQUIRED)** Contractor must submit to the District's Representative, within ten (10) days after the notice to proceed date, a drawing showing the existing shut-off valve locations for gas and water inside the Site. The Contractor must maintain immediate access to shut the valves off in an emergency, which may include the addition of daisy-chain locks, and shall post the approved drawing in the Contractor's onsite construction office.
22. **Completion of the Contractor Punch List: (REQUIRED BY CONTRACTOR PRIOR TO DISTRICT- ISSUED PUNCH LIST)** Prior to achieving Substantial Completion and prior to the District's consultant punch list walk, the Contractor shall prepare a Contractor's punch list of outstanding and corrective work and submit it to the District Representative along with any outstanding payment requests for Work completed up to one hundred percent (100%), less retention. The Contractor shall make repairs and corrections and deliver to the District Representative a signed copy of the Contractor's punch list indicating all Work has been completed. The District may consent to reduce the contract retention withheld to five percent (5%) upon completion of the Contractor's punch list work. No payment requests will be processed without the Contractor's punch list attached.

- 23. Completion of the Project Punch List:** Upon receipt of Contractor's signed punch list indicating all Work is complete, the District's consultants and District Representative shall generate and transmit to the Contractor, the Project punch list. A punch list completion walk with the District's consultants and District's Representative shall be scheduled fifteen (15) days after the Project punch list is issued to the Contractor. The Contractor has fourteen (14) days from the date of receipt of the Project punch list to complete or correct the items noted therein. Failure to complete the Work noted on the Project punch list subjects the District to extended costs from the Architect, Consultants, IOR, and construction management staff. In the event the Contractor shall request a determination of Substantial Completion or Final Completion and it is determined by the District's Inspector that the Work does not then justify certification of Final Completion and re-inspection is required at a subsequent time to make such determination accordance with re-inspection 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 and District Representative. The District may deduct such costs from the Contract Price then due or thereafter due to the Contractor. All costs accrued by the District resulting from the extended Project duration due to failure of Contractor to diligently work on correcting the Project punch list items shall be back- charged to the Contractor and deducted from the Contractor's final retention funds.
- 24. Protection from Theft:** Contractor shall protect all items within the boundaries of the Site and within classrooms, office spaces, and storage rooms from theft. Contractor shall be responsible for locking and securing the rooms and site each day. Contractor shall be responsible for the replacement cost of items stolen.
- 25. Prevailing Wages:** This Project is subject to the requirements of Subchapter 4.5 of Chapter 8 of Title 8 of the California Code of Regulations. Contractor and all Subcontractors must furnish certified payroll records to the Department of Industrial Relations' Compliance Monitoring Unit (DIR) at least monthly, or within ten (10) days of any separate request by the Compliance Monitoring Unit, in the manner required by the Compliance Monitoring Unit. Pursuant to 8 CCR 16463(e), the District may withhold Contract payments when payroll records are delinquent or inadequate or as required by the Labor Commissioner. The amount withheld shall be limited to those payments due or estimated to be due to the Contractor or Subcontractor whose payroll records are delinquent or inadequate, plus any additional amount that the Labor Commissioner has reasonable cause to believe may be needed to cover a back wage and penalty assessment against the Contractor or Subcontractor whose payroll records are delinquent or inadequate; provided that a Contractor shall be required in turn to cease all payments to a Subcontractor whose payroll records are delinquent or inadequate until the Labor Commissioner provides notice that the Subcontractor has cured the delinquency or deficiency.
- 26. Beneficial Occupancy.** For the purposes of these specifications, "Beneficial Occupancy" is defined as the necessary occupancy of the facility or any portion of the Work by District staff or students, for its intended purpose, whether or not Substantial Completion has occurred. Beneficial Occupancy does not relieve the Contractor of potential or actual liquidated damages if, in the opinion of the Architect, District Inspector, and District Representative, the Work is not substantially complete within the Contract time.
- 27. Delivery Order Durations.** (This section applies to IQ contracts only.) Each delivery order shall include the number of calendar days to complete the Work contained within that delivery order. Failure to complete a delivery order within the specified time excluding any District approved time extensions shall subject the Contractor to the assessment of liquidated damages.
- 28. Project Reporting and Record Keeping by Awarded Contractor (Mandatory Project Daily Report and Sign In Sheet)** As a part of this Bid and Project, the District has made it a mandatory requirement that the awarded Contractor and their Subcontractors-vendors or specialty trades submit to the District on a daily basis and no later than at the end of each work day (no later than 12 Midnight of that day), a completed hard copy original document type daily report" of that day's Work activities that were performed on Site by the awarded Contractor, any Subcontractors or vendors and specialty trades.

- 29. Mandatory Registration with the Department of Industrial Relations.** Senate Bill 854 (2014) requires all contractors and subcontractors submitting bids on public works projects to be registered with the Department of Industrial Relations (“DIR”) for purposes of labor compliance. All contractors and subcontractors must submit proof of valid, accurate, and current DIR registration with their bid. Silver Valley Unified School District will not accept bids from any contractors or subcontractors who are not registered with the DIR at the time the bid is submitted. All contractors and subcontractors who submit a bid without demonstrating proof of a valid, accurate, and current DIR registration number at the time of bid will have their bids rejected as non-responsive. All contractors must affirmatively acknowledge their obligation not to hire subcontractors who lack an accurate, valid DIR registration number.

[END OF SPECIAL CONDITIONS]

SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's New Gymnasium Project

BID No. 20240270-01

**SECTION 9
SPECIFICATIONS/SCOPE
OF WORK**

Scope of Work

For project Specifications see trade sections

For Scope of work see Specification 01 10 00, Summary section.

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SILVER VALLEY UNIFIED SCHOOL DISTRICT

Yermo School's New Gymnasium Project

BID No. 20240270-01

**SECTION 10
PROJECT FORMS &
CERTIFICATIONS**

[DISTRICT LETTERHEAD]

NOTICE OF INTENT TO AWARD

[insert addresses for all bidders]

Re: Notice of Intent to Award

The Silver Valley Unified School District ("District") hereby notifies you of its intent to award the recently bid **Yermo School's New Gymnasium Project** to [redacted] at its bid price of \$ [redacted].

[Insert name of apparent low bidder] is requested to execute the Contract and furnish the required Performance Bond and Payment Bond using the bond forms provided in the Contract Documents and the required certificates of insurance within ten (10) calendar days from the date of issuance of this Notice.

If you fail to execute the Contract and to furnish the bonds and insurance within ten (10) calendar days from the date of issuance of this Notice, the District may consider all your rights arising out of its acceptance of your bid as abandoned and your Bid Bond forfeited. The District will be entitled to such other rights as may be granted by law.

Dated this _____ day of _____, 20____.

Very truly yours,

By _____
Authorized District Signature

[DISTRICT LETTERHEAD]

NOTICE TO PROCEED

To:

Date:

SUBJECT: **NOTICE TO PROCEED**
PROJECT: Yermo School's New Gymnasium Project

Dear _____:

You are hereby notified to commence work on the above referenced project for the not-to-exceed amount of [Insert Contract Amount] for the base bid proposal.

Work shall commence on [Insert start date] and shall be fully complete within the Contract Time set forth in the Contract Documents with a final completion date of December 31, 2024. Delivery of submittals shall commence upon receipt of the District's Notice to Proceed.

The Contract Documents provide for an assessment of [Insert Liquidated Damages Amount] as liquidated damages for each consecutive calendar day that the work remains incomplete after the above established contract completion date.

By: _____
Authorized District Signature

WORKERS' COMPENSATION CERTIFICATION

Labor Code section 3700 in relevant part 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 as 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.

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

Name

Title

Company

(In accordance with article 5 (commencing at section 1860), chapter 1, part 7, division 2 of the Labor Code, the above certificate must be signed and filed with the awarding body prior to performing any work under this contract.)

DRUG-FREE WORKPLACE CERTIFICATION

This Drug-Free Workplace Certification form is part of the Contract made by and between the **SILVER VALLEY UNIFIED SCHOOL DISTRICT** (hereinafter referred to as the "District" and (hereinafter referred to as the ("Contractor")) for the **Yermo School's New Gymnasium Project, Bid No. 20240270-01** (hereinafter referred to as the "Project." This form is required from all successful bidders pursuant to the Drug-Free Workplace Act of 1990 (Government Code section 8350 et seq.) The Drug-Free Workplace Act requires that every person or organization awarded a contract or grant for procurement of any property or service from any State agency must certify that it will provide a drug-free workplace by doing certain specified acts. In addition, the Act provides that each contract or grant awarded by a State agency may be subject to suspension of payments or termination, and the contractor or grantee may be subject to debarment from future contracting, if the contracting agency determines that specified acts have occurred. The District is not a "state agency" as defined in the applicable section(s) of the Government Code, but the District is a local agency under California law and requires all contractors on public works projects to comply with the provisions and requirements of the Drug-Free Workplace Act.

Pursuant to Government Code section 8355, every person or organization awarded a contract or grant from a State agency shall certify that it will provide a drug-free workplace 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 their workplace and specifying actions which will be taken against employees for violations 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. The person's or organization'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 or grant be given a copy of the statement required by subdivision A, and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.

I, the undersigned, agree to fulfill the terms and requirements of the Drug-Free Workplace Act as it now exists or may hereinafter be amended. Particularly, I shall abide by Government Code section 8355 when performing the Contract for the Project by:

- A. Publishing a statement notifying employees concerning the prohibition of controlled substance at my workplace;
- B. Establishing a drug-free awareness program; and
- C. Requiring that each employee engaged in the performance of the contract be given a copy of the statement required by section 8355(a) and agree to abide by the terms of that statement.

I also understand that if the District determines that I have either: (a) made a false certification herein; or (b) violated this certification by failing to carry out the requirements of section 8355, the Contract

awarded herein is subject to termination, suspension of payments, or both. I further understand that if I violate the terms of the Drug-Free Workplace Act, I may be subject to debarment.

I acknowledge that I am aware of the provisions of Government Code section 8350 et seq., and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act.

Executed on this _____ day of _____, 20____ at _____.

Name of Contractor (Print or Type)

By: _____
Signature

Print Name

Title

**CONTRACTOR'S CERTIFICATE REGARDING
ALCOHOLIC BEVERAGE AND TOBACCO-FREE CAMPUS POLICY**

The Contractor agrees that it will abide by and implement the District's Alcoholic Beverage and Tobacco-Free Campus Policy, which prohibits the use of alcoholic beverages and tobacco products, at any time, on District-owned or leased buildings, on District property and in District vehicles. The Contractor shall procure signs stating "ALCOHOLIC BEVERAGE AND TOBACCO USE IS PROHIBITED" and shall ensure that these signs are prominently displayed in all entrances to school property at all times.

Date: _____

Contractor

By: _____
Signature

ASBESTOS-FREE MATERIALS CERTIFICATION

The undersigned declares that he or she is the person who executed the bid for **Yermo School's new Gymnasium Bid No. 20240270-01** ("Project"), and submitted it to the District on behalf of _____ ("Contractor").

To the best of my knowledge, information and belief, in completing the Contractor's Work for the Project, no material furnished, installed or incorporated into the Project will contain, or in itself be composed of, any materials listed by the federal or state EPA or federal or state health agencies as a hazardous material.

Any disputes involving the question of whether or not material installed with asbestos-containing equipment is settled by electron microscopy; the cost of any such tests shall be paid by the Contractor.

All work or materials installed by the Contractor which is found to contain asbestos, or work or material installed with asbestos-containing equipment, will be immediately rejected and this work shall be removed and replaced by the Contractor at no additional cost to the District. Decontamination and removal of work found to contain asbestos or work installed with asbestos-containing equipment shall be done only under supervision of a qualified consultant, knowledgeable in the field of asbestos abatement and accredited by the Environmental Protection Agency.

The ASBESTOS REMOVAL CONTRACTOR shall be an EPA accredited contractor qualified in the removal of asbestos and shall be chosen and approved by the Asbestos Consultant who shall have sole discretion and final determination in this matter.

The asbestos consultant shall be chosen and approved by the Construction Manager/Architect or the District who shall have sole discretion and final determination in this matter.

The work will be not accepted until asbestos contamination is reduced to levels deemed acceptable by the Asbestos Consultant.

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

Executed on this _____ day of _____, 20__.

Name of Contractor (Print or Type)

Signature

Print Name

Title

CONTRACTOR & SUBCONTRACTOR FINGERPRINTING REQUIREMENTS

CONTRACTOR CERTIFICATION

With respect to the Contract dated _____ 20__ by and between Silver Valley Unified School District ("District") and _____ ("Contractor"), Contractor hereby certifies to the District's governing board that it has completed the criminal background check requirements of Education Code Section 45125.1 and that none of its employees that may come in contact with District's pupils have been convicted of a violent felony listed in Penal Code section 667.5(c) or a serious felony listed in Penal Code section 1192.7(c).

Contractor's Representative Date

or

CONTRACTOR EXEMPTION

Pursuant to Education Code Sections 45125.1 and 45125.2, the Silver Valley Unified School District ("District") has determined that _____ ("Contractor") is exempt from the criminal background check certification requirements for the Contract dated _____ 20__ by and between the District and Contractor ("Contract") because:

- The Contractor's employees will have limited contact with District students during the course of the Contract;
- Emergency or exceptional circumstances exist; or
- With respect to contractors constructing, reconstructing, rehabilitating or repairing a school facility, as provided in Section 45125.2, the Contractor has agreed to ensure the safety of pupils at the school facility by the following method(s) specified in Section 45125.2:

_____.

School District Official Date

CONTRACTOR & SUBCONTRACTOR FINGERPRINTING REQUIREMENTS

SUBCONTRACTOR’S CERTIFICATION

The Silver Valley Unified School District (“District”) entered into a Contract for services with _____ (“Contractor”) on or about _____, 20____ (“Contract”). This certification is submitted by _____, a subcontractor to the Contractor for purposes of that Contract (“Subcontractor”). Subcontractor hereby certifies to the District’s governing board that it has completed the criminal background check requirements of Education Code Section 45125.1 and that none of its employees that may come in contact with District pupils have been convicted of a violent felony listed in Penal Code Section 667.5(c) or a serious felony listed in Penal Code Section 1192.7(c).

Subcontractor’s Representative Date

or

SUBCONTRACTOR’S EXEMPTION

The Silver Valley Unified School District (“District”) entered into a Contract for services with _____ (“Contractor”) on or about _____, 20____ (“Contract”). Pursuant to Education Code Sections and 45125.2, the District has determined that _____, a subcontractor to the Contractor for purposes of that Contract (“Subcontractor”), is exempt from the criminal background check certification requirements for the Contract because:

- The Subcontractor’s employees will have limited contact with District students during the course of the Contract;
- Emergency or exceptional circumstances exist; or
- With respect to contractors constructing, reconstructing, rehabilitating or repairing a school facility, as provided in Section 45125.2, the Contractor and/or Subcontractor have agreed to ensure the safety of pupils at the school facility by the following method(s) specified in Section 45125.2: _____.

School District Official Date

BIDDER'S ACKNOWLEDGEMENT OF PROJECT SCHEDULE

Yermo School's New Gymnasium Project

Bid No. 20240270-01

The undersigned acknowledges that he/she has carefully and thoroughly reviewed the Project Schedule, included herein and made a part of the Contract Documents.

The undersigned fully understands the manpower requirements necessary to complete the project in accordance with the Project Schedule and agrees to furnish all labor, materials and equipment necessary, upon District acceptance of bidder's proposal, to fully comply with this schedule. The undersigned agrees to comply with any and all adjustments to the schedule, as may be directed by the District or its representative, and which may be required to ensure project completion as stipulated in the Contract Documents.

The undersigned acknowledges that failure to comply with the above could result in delays to other contractors, whose bona fide and substantiated cost impacts due to said delays may be borne by the undersigned.

ACKNOWLEDGED AND AGREED:

DATE: _____

CONTRACTOR

BY: _____
Signature

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

I am aware of and hereby certify that neither _____ nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. I further agree that I will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the bidder/offeror/ contractor or any lower participant is unable to certify this statement, it shall attach an explanation to this solicitation proposal.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal of the above named bidder on the _____ day of _____, 20____ for the purposes of submission of this bid.

(Corporate Seal)

By _____
Signature

Typed or Printed Name

Title

Date

As the awardee under this Bid, I hereby certify that the above certification remains valid as of the date of contract award, specifically, as of the ____ day of _____, 20____, for the purposes of award of this contract.

(Corporate Seal)

By _____
Signature

Typed or Printed Name

Title

Date

IRAN CONTRACTING ACT CERTIFICATION

As required by California Public Contract Code Section 2204, the Bidder certifies subject to penalty for perjury that the option checked below relating to the Bidder's status in regard to the Iran Contracting Act of 2010 (Public Contract Code Section 2200 et seq.) is true and correct:

- The Bidder is not:
 - (i) identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code Section 2203; or
 - (ii) a financial institution that extends, for 45 days or more, credit in the amount of \$20,000,000 or more to any other person or entity identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code Section 2203, if that person or entity uses or will use the credit to provide goods or services in the energy sector in Iran.

- The District has exempted the Contractor from the requirements of the Iran Contracting Act of 2010 after making a public finding that, absent the exemption, Agency will be unable to obtain the goods and/or services to be provided pursuant to the Contract.

- The amount of the Contract payable to the Contractor for the Project does not exceed \$1,000,000.

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

Signature Date

Name Title

Name of Firm

SUBSTITUTION REQUEST FORM

Pursuant to Public Contract Code Section 3400, bidder hereby requests substitution of the following articles, devices, equipment, products, materials, fixtures, patented processes, forms, methods, or types of construction:

<u>Specified Items</u>	<u>Requested Substituted Items</u>	<u>Agree to Provide Specified Item In the Event Request is Denied¹ (circle one)</u>		<u>District Decision on substitution Request (circle one)</u>
1. _____	_____	Yes	No	Grant Deny
2. _____	_____	Yes	No	Grant Deny
3. _____	_____	Yes	No	Grant Deny
4. _____	_____	Yes	No	Grant Deny
5. _____	_____	Yes	No	Grant Deny
6. _____	_____	Yes	No	Grant Deny
7. _____	_____	Yes	No	Grant Deny
8. _____	_____	Yes	No	Grant Deny
9. _____	_____	Yes	No	Grant Deny

¹ Bidder must state whether bidder will provide the Specified Item in the event that District denies the request for substitution. If bidder states that bidder will not provide the Specified Item in the event their request for substitution is denied, bidder's bid may be considered nonresponsive. However, if bidder states that bidder will provide the Specified Item in the event that bidder's request for substitution is denied, bidder shall execute the Agreement and provide such Specified Item(s) and if bidder fails to execute the Agreement with the Specified Item(s), bidder's bond may be forfeited.

**CONTRACTOR'S CERTIFICATE REGARDING
PARTICIPATION OF
DISABLED VETERAN BUSINESS ENTERPRISES**

In accordance with Education Code Section 17076.11, the District has a participation goal for Disabled Veteran Business Enterprises of at least three percent (3%) per year of the overall dollar amount of funds allocated by the District by the State Allocation Board pursuant to the Leroy F. Greene School Facilities Act of 1998 for construction or modernization of school buildings and expended each year by the District. 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. Prior to, and as a condition precedent for final payment under the contract, the Contractor will provide appropriate documentation to the District identifying the amount paid to Disabled Veteran Business Enterprises pursuant to the contract, so that the District can assess its success at meeting this goal.

I certify that I have read the above and will comply with the anticipated participation of Disabled Veteran Business Enterprises in this contract.

Signature

Typed or Printed Name

Title

Company

Email

CALIFORNIA AIR RESOURCES BOARD (CARB) COMPLIANCE CERTIFICATION

Effective January 1, 2024 and pursuant to Section 2449(i) of Title 13 of the California Code of Regulations, all public agencies in the State of California awarding or entering into a contract for the erection, construction, alteration, repair, removal, or improvement of any public structure, building, road, or any other public lands, property, or improvement of any kind will be required to obtain a valid Certificate of Reported Compliance (“CRC”) from all contractors and subcontractors before awarding a public works project. Complete the form below and submit the CRC if applicable.

- Not applicable as no rented or owned “Off-Road Diesel-Fuel vehicles” will be used for any projects under this Agreement.
- “Off-Road Diesel-Fuel vehicles” will be used for projects under this Agreement. CONTRACTOR’S CARB compliance certification is attached to this Appendix B.

Completed by:

Signature of CONTRACTOR

Name printed or typed

Title

Date

For additional information visit <https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-contracting-requirements>

444-5/6855814.1

**PROJECT MANUAL
TRADE SECTIONS**

FOR

**YERMO SCHOOL - NEW GYMNASIUM @
YERMO SCHOOL**

**SILVER VALLEY UNIFIED SCHOOL DISTRICT
35320 DAGGET-YERMO RD
YERMO, CA 92327**

A#04-122674

SET NO. _____

**FRICK, FRICK & JETTÉ ARCHITECTS
19153 TOWN CENTER DRIVE, SUITE 101
APPLE VALLEY, CA 92308
(760) 240-6211**


IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-122674 INC:
REVIEWED FOR
SS FLS ACS
DATE: 08/09/2024

PROJECT MANUAL
TRADE SECTIONS

FOR

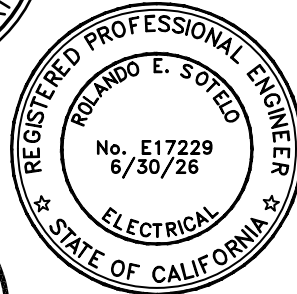
YERMO SCHOOL - NEW GYMNASIUM @
YERMO SCHOOL


SILVER VALLEY UNIFIED SCHOOL DISTRICT
35320 DAGGET-YERMO RD
YERMO, CA 92327


Gino C. Bastianon C-27546
ARCHITECT




Rolando E. Sotelo E-17229
ELECTRICAL




Steven Johnson M-33209
MECHANICAL




Kevin R. Westervelt S-5681
STRUCTURAL



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END OF SECTION

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contract description.
- B. Work by Owner.
- C. Owner supplied products.
- D. Contractor's use of site and premises.
- E. Work sequence.
- F. Specification Conventions.

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes New Gymnasium, fire alarm upgrade, and related site work at Yermo School located at 38280 Gleason St., Yermo, CA 92398.
- B. Perform Work of Contract under single lump sum contract with Owner in accordance with Conditions of Contract.

1.3 WORK BY OWNER

- A. Items noted NIC (Not in Contract) will be furnished and installed by Owner.

1.4 OWNER SUPPLIED PRODUCTS

- A. Items noted OFCI (Owner Furnished, Contractor Installed) will be furnished by Owner for installation by Contractor.

1.5 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Limit use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. Use of site and premises by Owner.

1.6 WORK SEQUENCE

- A. Construct Work in phases to accommodate Owner's occupancy requirements during construction period, coordinate construction schedule and operations with Owner and Architect.

1.7 SPECIFICATION CONVENTIONS

- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Schedule of values.
- B. Applications for payment.
- C. Change procedures.
- D. Cash allowances.
- E. Alternates.
- F. Unit Pricing

1.2 SCHEDULE OF VALUES

- A. Submit typed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values for review in duplicate within 15 days after date established in Notice to Proceed.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify site mobilization, bonds and insurance.
- D. Include in each line item, the amount of Allowances specified in this Section.
- E. Include separately from each line item, a directly proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, on continuation sheet, with each Application For Payment.

1.3 APPLICATIONS FOR PAYMENT

- A. Submit six copies of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702. Contractor's standard form or electronic media printout will be considered.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Payment Period: Submit at intervals stipulated in the Agreement.

1.4 CHANGE PROCEDURES

- A. The Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by General Conditions on AIA Form G710 Architect's Supplemental Instructions.
- B. The Architect may issue a Proposal Request including a detailed description of a proposed change with supplementary or revised Drawings and Specifications. Contractor will prepare and submit a detailed cost and time estimate within 14 days.
- C. The Contractor may propose a change by submitting a Change Order Request to the Architect, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation.
- D. Stipulated Sum Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's Change Order Request as approved by Architect.
- E. Construction Change Directive: Architect may issue a directive signed by the Owner and Architect, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum or Contract Time. Promptly execute the change.
- F. Change Order Forms: AIA G701 Change Order.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- H. Correlation Of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
 - 2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 - 3. Promptly enter changes in Project Record Documents.
- I. All Changes in the plans and specifications shall be approved by the Division of the State Architect and comply with the requirements of Title 21, Article I, Subsection 38.

1.5 CASH ALLOWANCES

- A. Include in the Contract stipulated Cash Allowances as indicated in the following schedule for use upon Owner's instruction.
- B. The Prime Contractor will be allowed no markup for overhead and profit or bond on Change Orders until Cash Allowance amount is depleted. Subcontractor and lower tier subcontractors will be allowed markups as indicated in the General Conditions.
- C. Funds will be drawn from Cash Allowance only by written authorization.
- D. At closeout of Contract, funds remaining in Cash Allowance will be credited to Owner by Change Order.
- E. Schedule of Cash Allowances:
 - 1. Cash Allowance No. 1: As a part of the Base Bid, provide a cash allowance of \$100,000.00 for unforeseen purposes.

1.6 ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work.
- C. Base Bid: Construct all work indicated on Contract Documents in its entirety with the exception of the Alternates listed below.
- D. Schedule of Alternates:
 - 1. Alternate No. 1 (Additive): Revise all new asphalt paving to 5" thick concrete over 4" aggregate base with 6"x6"-W1.4xW1.4 E.W.W.F, similar to detail 1/AD-1.

1.7 UNIT PRICING

- A. The following unit prices shall be to determine the net cost or credit of revision to the specified work at the District's option. These prices shall be binding for all revisions for the duration of the Contract.
- B. Schedule of Unit Prices:
 - 1. None

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Field engineering.
- C. Preconstruction meeting.
- D. Progress meetings.
- E. Pre-installation meetings.
- F. Cutting and patching.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's occupancy.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of California and acceptable to the Architect.
- B. Locate and protect survey control and reference points. Promptly notify Architect of discrepancies discovered.
- C. Control datum for survey is that established by Owner provided survey. Contractor to locate and protect survey control and reference points.

- D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- E. Submit copy of site drawing and certificate signed by Land Surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.
- F. Maintain complete and accurate log of control and survey work as Work progresses.
- G. On completion of foundation walls and major site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.
- H. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- I. Promptly report to Architect/Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- J. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

1.4 PRECONSTRUCTION MEETING

- A. Architect will schedule a meeting within 15 days after Notice of Intent to Award letter.
- B. Attendance Required: Owner, Owner's Resident Inspector, Owner's Testing Laboratory Representative, Architect, Contractor, Contractor's Project Manager and Contractor's Job Superintendent.
- C. Optional Attendance: Architect's consultants, subcontractors and utility company representatives.
- D. Architect will preside at meeting, record minutes and distribute copies.
- E. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Issue Notice to Proceed.
 - 3. Submission of executed bonds and insurance certificates.
 - 4. Distribution of Contract Documents.
 - 5. Submission of list of Subcontractors, list of products, Schedule of Values, and progress schedule.
 - 6. Designation of responsible personnel representing parties in Contract and Architect.
 - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 8. Scheduling.
 - 9. Scheduling activities of Geotechnical Engineer.
- F. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, and those affected by decisions made.

1.5 PROGRESS MEETINGS

- A. Architect will schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
- B. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes (Field Reports), and distribute copies.

- C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Owner's Resident Inspector, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes (Field Reports) of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to Work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, and those affected by decisions made.

1.6 PRE-INSTALLATION MEETINGS

- A. When required in individual specification Sections, convene pre-installation meetings prior to commencing work of specific Section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific Section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

- A. Employ original installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:

1. Fit the several parts together, to integrate with other Work.
 2. Uncover Work to install or correct ill-timed Work.
 3. Remove and replace defective and non-conforming Work.
 4. Remove samples of installed Work for testing.
 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Unless specifically shown on these plans, no structural member shall be cut, drilled or notched without prior written authorization from the Structural Engineer and the Division of the State Architect.
- E. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- F. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.
- G. Provide protection from elements for areas which may be exposed by uncovering work.
- H. Cut masonry and concrete materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- I. Restore Work with new products in accordance with requirements of Contract Documents.
- J. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- K. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- L. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of penetrated element.
- M. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- N. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Submittal procedures.
 - 2. Construction progress schedules.
 - 3. Proposed products list.
 - 4. Product data.
 - 5. Shop drawings.
 - 6. Samples.
 - 7. Certificates.
 - 8. Manufacturers' instructions.
 - 9. Erection drawings.
- B. Related Sections:
 - 1. Section 01 60 00 - Product Requirements: Product substitutions and substitution submittal procedures.

1.2 SUBMITTAL PROCEDURES

- A. Prepare complete submittal packages for each individual specification Section.
- B. Transmit a minimum of 6 copies of each submittal with Architect accepted form.
- C. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- D. Identify Project, Architect's project number, Contractor, subcontractor and supplier; pertinent Drawing sheet and detail number(s), and specification Section number, appropriate to submittal.
- E. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Submittals without Contractor's stamp and signature will be returned without review.
- F. Schedule submittals to expedite the Project, and deliver to Architect at business address. Coordinate submission of related items.
- G. Make submittals in groups containing associated and related items to make sure that information is available for checking each item when it is received.
- H. Make submittals enough in advance of scheduled dates for installation to provide time for review and possible revisions and resubmission prior to approval and subsequent placement of orders.
- I. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed Work.
- J. Allow space on submittals for Contractor and Architect/Engineer review stamps.

- K. When revised for resubmission, identify changes made since previous submission.
- L. Distribute copies of reviewed submittals to concerned parties as appropriate. Instruct parties to promptly report any inability to comply with provisions.
- M. Submittals not requested will not be recognized or processed.
- N. Submittals that are required to be reviewed by the Architect more than twice are subject to a professional services fee as specified in the General Conditions.

1.3 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial schedules in duplicate within 14 days after date established in Notice to Proceed. After review, resubmit required revised data within ten days.
- B. Submit revised Progress Schedules with each Application for Payment, identifying changes since previous version.
- C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Submit computer generated horizontal bar chart with separate line for each major portion of Work or operation, identifying first work day of each week. Provide critical path analysis.
- F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, 50% completion, early and late finish, float dates, duration and other major milestones.
- G. Indicate estimated percentage of completion for each item of Work at each submission.
- H. Submit separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- I. Indicate delivery dates for Owner furnished products.
- J. Revisions To Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
 - 3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.4 PROPOSED PRODUCTS LIST

- A. Within 14 days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number or each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

- A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. When specified in individual specification sections, submit number of copies of data for each product which Contractor requires, plus two copies which will be retained by Architect.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.6 SHOP DRAWINGS

- A. Shop Drawings: Submit to Architect for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
 - 1. Include signed and sealed calculations to support design.
 - 2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. When specified in individual specification sections, submit number of copies Contractor requires, plus two copies which will be retained by Architect.
- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.7 SAMPLES

- A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Samples For Selection as Specified in Product Sections:
 - 1. Submit to Architect for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from full range of manufacturers' standard and custom colors, textures, and patterns for Architect selection.
 - 3. Range shall include standard stocked color/texture/pattern, standard color/texture/pattern not stocked, but available from manufacturer, and special color/texture/pattern available from manufacturer as advertised in product data and brochures.
 - 4. Architect may select from any range at no additional cost to Owner.

- C. Architect will make no color selections until all submittals related to color have been received and materials reviewed.
- D. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- E. Include identification on each sample, with full Project information.
- F. Submit the number of samples which Contractor requires, plus two of which will be retained by Architect.
- G. Reviewed samples which may be used in the Work are indicated in individual specification Sections.
- H. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01 70 00 - Execution and Closeout Requirements.

1.8 CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.

1.9 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect for delivery to Owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.10 ERECTION DRAWINGS

- A. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- B. Data indicating inappropriate or unacceptable Work may be subject to action by Architect.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. Tolerances.
- C. References.
- D. Labeling.
- E. Mock-up requirements.
- F. Manufacturer's field services.
- G. Examination.
- H. Preparation.

1.2 QUALITY ASSURANCE AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturer's instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date for receiving bids, except where specific date is established by code.
- C. Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during progress of the specific work.
- D. When specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 LABELING

- A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.

1.6 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this Section and identified in respective product specification Sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be comparison standard for remaining Work.
- D. Where mock-up has been accepted by Architect and is specified in product specification Sections to be removed; remove mock-up and clear area when directed to do so by Architect.

1.7 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification Sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.

END OF SECTION

SECTION 01 41 00

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Selection and payment.
- B. Contractor submittals.
- C. Laboratory responsibilities.
- D. Laboratory reports.
- E. Limits on testing laboratory authority.
- F. Contractor responsibilities.
- G. Schedule of inspections and tests by owner's testing laboratory.
- H. Schedule of inspections and tests by contractor's testing laboratory.
- I. Inspection by the Owner.

1.2 REFERENCES

- A. ANSI/ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- B. ANSI/ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.
- C. 2022 California Building Code.
- D. 2022 California Fire Code.
- E. Title 24 of the California Code of Regulations.

1.3 SELECTION AND PAYMENT

- A. Owner will employ and pay for services of an independent testing laboratory approved by DSA to perform inspection and testing as specified by Owner's testing laboratory.
- B. Contractor shall employ and pay for services of an independent testing laboratory to perform inspection and testing as specified by Contractor's testing laboratory.
- C. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.4 OWNER'S LABORATORY RESPONSIBILITIES

- A. Test samples of mixes submitted by Inspector.
- B. Provide qualified personnel at site. Cooperate with Architect, Inspector and Contractor in performance of services.
- C. Perform specified inspection, sampling and testing of products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Architect, Inspector and Contractor of observed irregularities or non-conformance of Work or products.
- F. Perform additional inspections and tests required by Architect, Inspector or Division of the State Architect.
- G. Attend pre-construction meetings and progress meetings when requested by Architect.

1.5 LABORATORY REPORTS

- A. After each inspection and test, promptly submit one copy of laboratory report to Architect, Engineer, Owner's Resident Inspector approved by DSA, Division of the State Architect and Contractor.
- B. Reports shall include the following:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and specifications Section.
 - 6. Location in the Project.
 - 7. Type of inspection or test.
 - 8. Date of test.
 - 9. Results of tests.
 - 10. Conformance with Contract Documents.
- C. When requested by Architect, provide interpretation of test results.
- D. Verification of Test Reports: Each testing agency shall submit to the Architect and the Division of the State Architect a verified report in duplicate covering all of the tests which were required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time and at the completion of the project, covering all tests.

1.6 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop the Work.

1.7 CONTRACTOR RESPONSIBILITIES

- A. Submit proposed mix designs to Architect for review in accordance with specification Section 03 30 00.
- B. Cooperate with laboratory personnel, and provide access to the Work and to manufacturer's facilities.
- C. The Contractor shall notify the Owner's representative a sufficient time in advance of the manufacture of material to be supplied by him under the Contract Documents, which must by terms of the Contract be tested, in order that the Owner may arrange for the testing of same at the source of supply.
- D. Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated in the job.
- E. The Owner will select and pay testing laboratory, approved by DSA, costs for all tests and inspections, but may be reimbursed by the Contractor for such costs under the Contract Documents.
- F. Notify Architect, Owner's Resident Inspector and laboratory 48 hours prior to expected time for operations requiring inspection and testing services.
 - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to the Contractor's negligence.
- G. If additional testing/inspection is required for items described in paragraph 1.8, the Testing Lab approved by DSA must be employed by the Owner. All costs for additional testing/inspection required will be deducted by the Owner from the Contract Sum.

1.8 SCHEDULE OF INSPECTIONS AND TESTS BY OWNER'S TESTING LABORATORY

- A. Perform tests and inspections in conformance with 2022 California Building Code and Title 24 of the California Code of Regulations for all items listed on the DSA approved Tests & Inspections form 103.

1.9 SCHEDULE OF INSPECTIONS AND TESTS BY CONTRACTOR'S TESTING LABORATORY

- A. Plumbing
 - 1. Testing as specified in Division 22, including but not limited to: Sterilization, soil waste and vent, water piping, gas piping, downspouts and storm drains.
- B. Automatic Fire Sprinklers
 - 1. Testing as specified in Division 21, including but not be limited to: Hydrostatic pressure.
- C. Heating, Ventilating and Air Conditioning
 - 1. Testing as specified in Division 23, including but not be limited to: Ductwork tests, cooling tower tests, boiler tests, controls testing, piping tests, water and air systems, and test and balance of heating and air conditioning systems.
- D. Electrical
 - 1. Testing as specified in Division 26, including but not limited to: Equipment testing, all electrical system operations, and grounding system.
- E. Tests and Inspections as required by the DSA form 103.

1.10 INSPECTION BY THE OWNER

- A. An Inspector, approved by DSA, employed by the Owner in accordance with the requirement of State of California Code of Regulations, Title 24, Part 1 will be assigned to the Work. His duties are specifically defined in Section 4-342 of Title 24, Part 1.
- B. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this Contract.
- C. The Owner and his representatives shall at all times have access for the purpose of inspection to all parts of the work and to the shops wherein the work is in preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.
- D. The Owner shall have the right to reject materials and workmanship that are defective, or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Owner. If the Contractor does not correct such rejected work within a reasonable time, fixed by written notice, the Owner may correct same and charge the expense to the Contractor.
- E. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of the work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to the fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS, 2022 CBC

General

Application Number: 04-122674	School Name: Yermo Middle School	School District: Silver Valley Unified School District
DSA File Number: 36-72	Increment Number:	Date Created: 2024-08-09 09:26:36

IMPORTANT: This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A (2022 CBC).

****NOTE:** Undefined section and table references found in this document are from the CBC, or California Building Code.

KEY TO COLUMNS

1. TYPE	2. PERFORMED BY
<p>Continuous – Indicates that a continuous special inspection is required</p> <p>Periodic – Indicates that a periodic special inspection is required</p> <p>Test – Indicates that a test is required</p>	<p>GE (Geotechnical Engineer) – Indicates that the special inspection shall be performed by a registered geotechnical engineer or his or her authorized representative.</p> <p>LOR (Laboratory of Record) – Indicates that the test or special inspection shall be performed by a testing laboratory accepted in the DSA Laboratory Evaluation and Acceptance (LEA) Program. See CAC Section 4-335.</p> <p>PI (Project Inspector) – Indicates that the special inspection may be performed by a project inspector when specifically approved by DSA.</p> <p>SI (Special Inspection) – Indicates that the special inspection shall be performed by an appropriately qualified/approved special inspector.</p>

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2022 CBC

Table 1705A.6, Table 1705A.7, Table 1705A.8

Application Number: 04-122674	School Name: Yermo Middle School	School District: Silver Valley Unified School District
DSA File Number: 36-72	Increment Number:	Date Created: 2024-08-09 09:26:36

Geotechnical Reports: Project has a geotechnical report, or CDs indicate soils special inspection is required by GE

S1. GENERAL:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Verify that: •Site has been prepared properly prior to placement of controlled fill and/or excavations for foundations. •Foundation excavations are extended to proper depth and have reached proper material. •Materials below footings are adequate to achieve the design bearing capacity.	Periodic	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix (end of this form) form for exemptions.)

S2. SOIL COMPACTION AND FILL:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Perform classification and testing of fill materials.	Test	LOR*	* Under the supervision of the geotechnical engineer.
<input checked="" type="checkbox"/>	b. Verify use of proper materials, densities and inspect lift thicknesses, placement and compaction during placement of fill.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (Refer to specific items identified in the Appendix (end of this form) form for exemptions where soils SI and testing may be conducted under the supervision of a geotechnical engineer or LOR's engineering manager. In such cases, the LOR's form DSA 291 shall satisfy the soil SI and test reporting requirements for the exempt items.)
<input checked="" type="checkbox"/>	c. Compaction testing.	Test	LOR*	* Under the supervision of the geotechnical engineer. (Refer to specific items identified in the Appendix (end of this form) for exemptions where soils testing may be conducted under the supervision of a geotechnical engineer or LOR's engineering manager. In such cases, the LOR's form DSA 291 shall satisfy the soil test reporting requirements for the exempt items.)

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2022 CBC

Table 1705A.6, Table 1705A.7, Table 1705A.8

Application Number: 04-122674	School Name: Yermo Middle School	School District: Silver Valley Unified School District
DSA File Number: 36-72	Increment Number:	Date Created: 2024-08-09 09:26:36

S3. DRIVEN DEEP FOUNDATIONS (PILES):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Verify pile materials, sizes and lengths comply with the requirements.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	b. Determine capacities of test piles and conduct additional load tests as required.	Test	LOR*	* Under the supervision of the geotechnical engineer.
<input type="checkbox"/>	c. Inspect driving operations and maintain complete and accurate records for each pile.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	d. Verify locations of piles and their plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and record any pile damage.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	e. Steel piles.	Provide tests and inspections per STEEL section below.		
<input type="checkbox"/>	f. Concrete piles and concrete filled piles.	Provide tests and inspections per CONCRETE section below.		
<input type="checkbox"/>	g. For specialty piles, perform additional inspections as determined by the registered design professional in responsible charge.	*	*	* As defined on drawings or specifications.

S4. CAST-IN-PLACE DEEP FOUNDATIONS (PIERS):				
	Test or Special Inspection	Type	Performed By	Code References and Note
<input type="checkbox"/>	a. Inspect drilling operations and maintain complete and accurate records for each pier.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix (end of this form) for exemptions.)

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2022 CBC

Table 1705A.6, Table 1705A.7, Table 1705A.8

Application Number: 04-122674	School Name: Yermo Middle School	School District: Silver Valley Unified School District
DSA File Number: 36-72	Increment Number:	Date Created: 2024-08-09 09:26:36

	Test or Special Inspection	Type	Performed By	Code References and Note
<input type="checkbox"/>	b. Verify pier locations, diameters, plumbness, bell diameters (if applicable), lengths and embedment into bedrock (if applicable); record concrete or grout volumes.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix (end of this form) for exemptions.)
<input type="checkbox"/>	c. Confirm adequate end strata bearing capacity.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix (end of this form) for exemptions.)
<input type="checkbox"/>	d. Concrete piers.	Provide tests and inspections per CONCRETE section below.		

S5. RETAINING WALLS:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Placement, compaction and inspection of backfill.	Continuous	GE*	1705A.6.1. * By geotechnical engineer or his or her qualified representative. (See section S2 above).
<input type="checkbox"/>	b. Placement of soil reinforcement and/or drainage devices.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	c. Segmental retaining walls; inspect placement of units, dowels, connectors, etc.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. See DSA IR 18-2.
<input type="checkbox"/>	d. Concrete retaining walls.	Provide tests and inspections per CONCRETE section below.		
<input type="checkbox"/>	e. Masonry retaining walls.	Provide tests and inspections per MASONRY section below.		

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2022 CBC

Table 1705A.6, Table 1705A.7, Table 1705A.8

Application Number: 04-122674	School Name: Yermo Middle School	School District: Silver Valley Unified School District
DSA File Number: 36-72	Increment Number:	Date Created: 2024-08-09 09:26:36

S6. OTHER SOILS:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Soil Improvements	Test	GE*	Submit a comprehensive report documenting final soil improvements constructed, construction observation and the results of the confirmation testing and analysis to CGS (California Geological Survey) for final acceptance. * By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	b. Inspection of Soil Improvements	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	c.			

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (CONCRETE), 2022 CBC

Table 1705A.3; ACI 318-19 Sections 26.12 & 26.13

Application Number: 04-122674	School Name: Yermo Middle School	School District: Silver Valley Unified School District
DSA File Number: 36-72	Increment Number:	Date Created: 2024-08-09 09:26:36

C1. CAST-IN-PLACE CONCRETE				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Verify use of required design mix.	Continuous	SI	Table 1705A.3 Item 5, 1910A.1.
<input checked="" type="checkbox"/>	b. Identify, sample, and test reinforcing steel.	Test	LOR	1910A.2; ACI 318-19 Ch.20 and Section 26.6.1.2; DSA IR 17-10. (See Appendix (end of this form) for exemptions.)
<input checked="" type="checkbox"/>	c. During concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	Test	LOR	Table 1705A.3 Item 6; ACI 318-19 Sections 26.5 & 26.12.
<input checked="" type="checkbox"/>	d. Test concrete (f'c).	Test	LOR	1905A.1.17; ACI 318-19 Section 26.12.
<input checked="" type="checkbox"/>	e. Batch plant inspection: Periodic	See Notes	SI	Default of ' Continuous ' per 1705A.3.3. If approved by DSA, batch plant inspection may be reduced to ' Periodic ' subject to requirements in Section 1705A.3.3.1, or not required per 1705A.3.3.2. See IR 17-13. (See Appendix (end of this form) for exemptions.)
<input type="checkbox"/>	f. Welding of reinforcing steel.	Provide special inspection per STEEL, Category S/A4(d) & (e) and/or S/A5(g) & (h) below.		

C2. PRESTRESSED / POST-TENSIONED CONCRETE (IN ADDITION TO SECTION C1):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Sample and test prestressing tendons and anchorages.	Test	LOR	1705A.3.4, 1910A.3
<input type="checkbox"/>	b. Inspect placement of prestressing tendons.	Periodic	SI	1705A.3.4, Table 1705A.3 Items 1 & 9.

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (CONCRETE), 2022 CBC

Table 1705A.3; ACI 318-19 Sections 26.12 & 26.13

Application Number: 04-122674	School Name: Yermo Middle School	School District: Silver Valley Unified School District
DSA File Number: 36-72	Increment Number:	Date Created: 2024-08-09 09:26:36

	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	c. Verify in-situ concrete strength prior to stressing of post-tensioning tendons.	Periodic	SI	Table 1705A.3 Item 13. Special inspector to verify specified concrete strength test prior to stressing.
<input type="checkbox"/>	d. Inspect application of post-tensioning or prestressing forces and grouting of bonded prestressing tendons.	Continuous	SI	1705A.3.4, Table 1705A.3 Item 9; ACI 318-19 Section 26.13

C3. PRECAST CONCRETE (IN ADDITION TO SECTION C1):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect fabrication of precast concrete members.	Continuous	SI	ACI 318-19 Section 26.13, and PCI MNL-128 and -130.
<input type="checkbox"/>	b. Inspect erection of precast concrete members.	Periodic	SI*	Table 1705A.3 Item 10. * May be performed by PI when specifically approved by DSA.
<input type="checkbox"/>	c. For precast concrete diaphragm connections or reinforcement at joints classified as moderate or high deformability elements (MDE or HDE) in structures assigned to Seismic Design Category D, E or F, inspect such connections and reinforcement in the field for: 1. Installation of the embedded parts 2. Completion of the continuity of reinforcement across joints. 3. Completion of connections in the field.	Continuous	SI	Table 1705A.3; ACI 318-19 Section 26.13.1.3; ACI 550.5
<input type="checkbox"/>	d. Inspect installation tolerances of precast concrete diaphragm connections for compliance with ACI 550.5.	Periodic	SI	Table 1705A.3; ACI 318-19 Section 26.13.1.3; ACI 550.5

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Table 1705A.3; ACI 318-19 Sections 26.12 & 26.13

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C4. SHOTCRETE (IN ADDITION TO SECTION C1):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect shotcrete placement for proper application techniques.	Continuous	SI	1705A.3.9, Table 1705A.3 Item 7, 1908A.1, 1908A.2, 1908A.3. See ACI 506.2-13 Section 3.4, ACI 506R-16.
<input type="checkbox"/>	b. Sample and test shotcrete (f _c).	Test	LOR	1908A.2, 1705A.3.9

C5. POST-INSTALLED ANCHORS:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Inspect installation of post-installed anchors	See Notes	SI*	1617A.1.19, Table 1705A.3 Item 4a (Continuous) & 4b (Periodic), 1705A.3.8 (See Appendix (end of this form) for exemptions). ACI 318-19 Section 26.13. * May be performed by the project inspector when specifically approved by DSA.
<input checked="" type="checkbox"/>	b. Test post-installed anchors.	Test	LOR	1910A.5. (See Appendix (end of this form) for exemptions.)

C6. OTHER CONCRETE:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a.			

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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S/A1. STRUCTURAL STEEL, COLD-FORMED STEEL AND ALUMINUM USED FOR STRUCTURAL PURPOSES				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Verify identification of all materials and: • Mill certificates indicate material properties that comply with requirements. • Material sizes, types and grades comply with requirements.	Periodic	*	Table 1705A.2.1 Item 3a 3c. 2202A.1; AISI S100-20 Section A3.1 & A3.2, AISI S240-20 Section A3 & A5, AISI S220-20 Sections A4 & A6. * By special inspector or qualified technician when performed off-site.
<input checked="" type="checkbox"/>	b. Test unidentified materials	Test	LOR	2202A.1.
<input checked="" type="checkbox"/>	c. Examine seam welds of HSS shapes	Periodic	SI	DSA IR 17-3.
<input checked="" type="checkbox"/>	d. Verify and document steel fabrication per DSA-approved construction documents.	Periodic	SI	Not applicable to cold-formed steel light-frame construction, except for trusses (1705A.2.4).
<input type="checkbox"/>	e. Buckling restrained braces.	Test	LOR	Testing and special inspections in accordance with IR 22-4.

S/A2. HIGH-STRENGTH BOLTS:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Verify identification markings and manufacturer's certificates of compliance conform to ASTM standards specified in the DSA-approved documents.	Periodic	SI	Table 1705A.2.1 Items 1a & 1b, 2202A.1; AISC 360-16 Section A3.3, J3.1, and N3.2; RCSC 2014 Section 1.5 & 2.1; DSA IR 17-8 & DSA IR 17-9.
<input checked="" type="checkbox"/>	b. Test high-strength bolts, nuts and washers.	Test	LOR	Table 1705A.2.1 Item 1c, 2213A.1; RCSC 2014 Section 7.2; DSA IR 17-8.
<input type="checkbox"/>	c. Bearing-type ("snug tight") connections.	Periodic	SI	Table 1705A.2.1 Item 2a, 1705A.2.6, 2204A.2; AISC 360-16 J3.1, J3.2, M2.5 & N5.6; RCSC 2014 Section 9.1; DSA IR 17-9.
<input checked="" type="checkbox"/>	d. Pretensioned and slip-critical connections.	*	SI	Table 1705A.2.1 Items 2b & 2c, 1705A.2.6, 2204A.2; AISC 360-16 J3.1, J3.2, M2.5 & N5.6; RCSC 2014 Sections 9.2 & 9.3; DSA IR 17-9. **"Continuous" or "Periodic" depends on the tightening method used.

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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S/A3. WELDING:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Verify weld filler material identification markings per AWS designation listed on the DSA-approved documents and the WPS.	Periodic	SI	1705A.2.5, Table 1705A.2.1 Items 4 & 5; AWS D1.1 and AWS D1.8 for structural steel; AWS D1.2 for Aluminum; AWS D1.3 for cold-formed steel; AWS D1.4 for reinforcing steel; DSA IR 17-3.
<input checked="" type="checkbox"/>	b. Verify weld filler material manufacturer's certificate of compliance.	Periodic	SI	DSA IR 17-3.
<input checked="" type="checkbox"/>	c. Verify WPS, welder qualifications and equipment.	Periodic	SI	DSA IR 17-3.

S/A4. SHOP WELDING (IN ADDITION TO SECTION S/A3):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.	Continuous	SI	Table 1705A.2.1 Items 5a.1 4; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.
<input checked="" type="checkbox"/>	b. Inspect single-pass fillet welds ≤ 5/16", floor and roof deck welds.	Periodic	SI	1705A.2.2, Table 1705A.2.1 Items 5a.5 & 5a.6; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.
<input type="checkbox"/>	c. Inspect welding of stairs and railing systems.	Periodic	SI	1705A.2.1; AISC 360-16 (and AISC 341-16 as applicable); AWS D1.1 & D1.3; DSA IR 17-3.
<input type="checkbox"/>	d. Verification of reinforcing steel weldability other than ASTM A706.	Periodic	SI	1705A.3.1; AWS D1.4; DSA IR 17-3. Verify carbon equivalent reported on mill certificates.
<input type="checkbox"/>	e. Inspect welding of reinforcing steel.	Continuous	SI	Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 Item 2, 1903A.8; AWS D1.4; DSA IR 17-3.

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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	Test or Special Inspection	Type	Performed By	Code References and Notes
S/A5. FIELD WELDING (IN ADDITION TO SECTION S/A3):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.	Continuous	SI	Table 1705A.2.1 Items 5a.1 4; AISC 360-16 (AISC 341-16 as applicable); DSA IR 17-3.
<input checked="" type="checkbox"/>	b. Inspect single-pass fillet welds ≤ 5/16".	Periodic	SI	Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as applicable); DSA IR 17-3.
<input type="checkbox"/>	c. Inspect end-welded studs (ASTM A-108) installation (including bend test).	Periodic	SI	2213A.2; AISC 360-16 (AISC 341-16 as applicable); AWS D1.1; DSA IR 17-3.
<input type="checkbox"/>	d. Inspect floor and roof deck welds.	Periodic	SI	1705A.2.2, Table 1705A.2.1 Item 5a.6; AISC 360-16 (AISC 341-16 as applicable); AWS D1.3; DSA IR 17-3.
<input type="checkbox"/>	e. Inspect welding of structural cold-formed steel.	Periodic	SI*	1705A.2.5; AWS D1.3; DSA IR 17-3. The quality control provisions of AISI S240-20 Chapter D shall also apply. * May be performed by the project inspector when specifically approved by DSA.
<input type="checkbox"/>	f. Inspect welding of stairs and railing systems.	Periodic	SI*	1705A.2.1; AISC 360-16 (AISC 341-16 as applicable); AWS D1.1 & D1.3; DSA IR 17-3. * May be performed by the project inspector when specifically approved by DSA.
<input type="checkbox"/>	g. Verification of reinforcing steel weldability.	Periodic	SI	1705A.3.1; AWS D1.4; DSA IR 17-3. Verify carbon equivalent reported on mill certificates.
<input type="checkbox"/>	h. Inspect welding of reinforcing steel.	Continuous	SI	Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 Item 2, 1903A.8; AWS D1.4; DSA IR 17-3.

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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	Test or Special Inspection	Type	Performed By	Code References and Notes
S/A6. NONDESTRUCTIVE TESTING:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Ultrasonic	Test	LOR	1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-16 N5.5; AWS D1.1, AWS D1.8; DSA IR 17-2.
<input type="checkbox"/>	b. Magnetic Particle	Test	LOR	1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-16 N5.5; AWS D1.1, AWS D1.8; DSA IR 17-2.
<input type="checkbox"/>	c.	Test	LOR	

S/A7. STEEL JOISTS AND TRUSSES:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Verify size, type and grade for all chord and web members as well as connectors and weld filler material; verify joist profile, dimensions and camber (if applicable); verify all weld locations, lengths and profiles; mark or tag each joist.	Continuous	SI	1705A.2.3, Table 1705A.2.3; AWS D1.1; DSA IR 22-3 for steel joists only. 1705A.2.4; AWS D1.3 for cold-formed steel trusses.

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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Test or Special Inspection	Type	Performed By	Code References and Notes
S/A8. SPRAYED FIRE-RESISTANT MATERIALS:			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> a. Examine structural steel surface conditions, inspect application, take samples, measure thickness and verify compliance of all aspects of application with DSA-approved documents.	Periodic	SI	1705A.15, 1705A.15.1, 1705A.15.2, 1705A.15.3, 1705A.15.4, 1705A.15.5, 1705A.15.6.
<input type="checkbox"/> b. Test density.	Test	LOR	1705A.15.1, 1705A.15.5, ASTM E605
<input type="checkbox"/> c. Bond strength adhesion/cohesion.	Test	LOR	1705A.15.1, 1705A.15.6, ASTM E736

S/A9. ANCHOR BOLTS AND ANCHOR RODS:			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/> a. Anchor Bolts and Anchor Rods	Test	LOR	Identify, sample and test anchor bolts and anchor rods not meeting exemptions identified in Section 1 of IR 17-11.
<input checked="" type="checkbox"/> b. Threaded rod not used for foundation anchorage.	Test	LOR	Identify, sample and test threaded rods not meeting exemptions identified in Section 1 of IR 17-11.

S/A10. STORAGE RACK SYSTEMS:			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> a. Materials used, to verify compliance with one or more of the material test reports in accordance with the approved construction documents.	Periodic	SI	Table 1705A.13.7
<input type="checkbox"/> b. Fabricated storage rack elements.	Periodic	SI	1704A.2.5; Table 1705A.13.7

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	c. Storage rack anchorage installation.	Periodic	SI	ANSI/MH16.1 Section 7.3.2; Table 1705A.13.7
<input type="checkbox"/>	d. Completed storage rack system to indicate compliance with the approved construction documents.	Periodic	SI*	Table 1705A.13.7; * May be preformed by the project inspector when specifically approved by DSA.

S/A11. Other Steel				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a.			

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X1. OTHER:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Load test for identified product(s):	Test	LOR	1709A.2, 1709A.3. Testing is not required for: 1) a product with a valid evaluation service report per DSA IR A-5, or 2) a product that can be justified by structural calculation.
<input type="checkbox"/>	b. Installation torque for non-HS bolts	Continuous	SI*	Applicable to communication towers identified as Essential Service Facility Projects (ESFP). Calibrated wrench use required, verified by SI during installation. DSA Policy PL 18-01: Communication Towers, Poles and Buildings Utilized by State Agencies for Essential Services Communications.*EXCEPTION: Non-ESFP may use PI without need for notification to DSA.
<input checked="" type="checkbox"/>	c. Inspection and testing of high strength PV panel anchor bolts.	Continuous	LOR	Bolts shall be identified, sampled and tested in accordance with DSA IR 17-8, AISC 360.
<input checked="" type="checkbox"/>	d. Torque testing of PV panel bolt installation.	Test	LOR	Pretension bolt connection and calibration and test equipment.

Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

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Exempt items given in DSA IR A-22 or the 2022 CBC (including DSA amendments) and those items identified below with a check mark by the design professional are NOT subject to DSA requirements for the structural tests / special inspections noted. **Items marked as exempt shall be identified on the approved construction documents.** The project inspector shall verify all construction complies with the approved construction documents.

SOILS:	
<input type="checkbox"/>	1. Deep foundations acting as a cantilever footing with a design based on minimum allowable pressures per CBC Table 1806A.2 and without a geotechnical report for the following cases: A) free standing sign or scoreboard, B) cell or antenna towers and poles less than 35'-0" tall (e.g., lighting poles, flag poles, poles supporting open mesh fences, etc.), C) single-story structure with dead load less than 5 psf (e.g., open fabric shade structure), or D) covered walkway structure with an apex height less than 10'-0" above adjacent grade.
<input type="checkbox"/>	2. Shallow foundations, etc. are exempt from special inspections and testing by a Geotechnical Engineer for the following cases: A) buildings without a geotechnical report and meeting the exception item #1 criteria in CBC Section 1803A.2 supported by native soil (any excavation depth) or fill soil (not exceeding 12" depth per CBC Section 1804A.6), B) soil scarification/recompaction not exceeding 12" depth, C) native or fill soil supporting exterior non-structural flatwork (e.g., sidewalks, site concrete ramps, site stairs, parking lots, driveways, etc.), D) unpaved landscaping and playground areas, or E) utility trench backfill with depth not exceeding 12".

CONCRETE/MASONRY:	
<input type="checkbox"/>	1. Post-installed anchors for the following: A) exempt non-structural components (e.g., mechanical, electrical, plumbing equipment - see item 7 for "Welding" in the Appendix below) given in CBC Section 1617A.1.18 (which replaces ASCE 7-16, Section 13.1.4) or B) interior nonstructural wall partitions meeting criteria listed in exempt item 3 for "Welding" in the Appendix below
<input type="checkbox"/>	2. Concrete batch plant inspection is not required for items given in CBC Section 1705A.3.3.2 subject to the requirements and limitations in that section.
<input type="checkbox"/>	3. Non-bearing non-shear masonry walls may be exempt from certain DSA masonry testing and special inspection items as allowed per DSA IR 21-1. Refer to construction documents for specific exemptions accordingly for each applicable wall condition shown in Appendix A of IR 21-1.
<input type="checkbox"/>	4. Epoxy shear dowels in site flatwork and/or other non-structural concrete.

Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

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CONCRETE/MASONRY:	
<input type="checkbox"/>	5. Testing of reinforcing bars is not required for items given in CBC Section 1910A.2 subject to the requirements and limitations in that section.

WELDING:	
<input type="checkbox"/>	1. Solid-clad and open-mesh fences, gates with maximum leaf span of 10', and gates with a maximum rolling section of 10' all having an apex height less than 8'-0" above lowest adjacent grade. When located above circulation or occupied space below, these gates/fences are not located within 1.5x gate/fence height (max 8'-0") to the edge of floor or roof.
<input type="checkbox"/>	2. Handrails, guardrails, and modular or relocatable ramps associated with walking surfaces less than 30" above adjacent grade (excluding post base connections per the 'Exception' language in Section 1705A.2.1); fillet welds shall not be ground flush.
<input type="checkbox"/>	3. Non-structural interior cold-formed steel framing spanning less than 15'-0", such as in interior partitions, interior soffits, etc. supporting only self weight and light-weight finishes or adhered tile, masonry, stone, or terra cotta veneer no more than 5/8" thickness and apex less than 20'-0" in height and not over an exit way. Maximum tributary load to a member shall not exceed the equivalent of that occurring from a 10'x10' opening in a 15' tall wall for a header or king stud.
<input type="checkbox"/>	4. Manufactured support frames and curbs using hot rolled or cold-formed steel (i.e., light gauge) for mechanical, electrical, or plumbing equipment weighing less than 2000# (equipment only) (connections of such frames to superstructure elements using welding will require special inspection as noted in selected item(s) for Sections S/A3, S/A4 and/or S/A5 of listing above).
<input type="checkbox"/>	5. Manufactured components (e.g., Tolco, B-Line, Afcon, etc.) for mechanical, electrical, or plumbing hanger support and bracing (connections of such components to superstructure elements using welding will require special inspection as noted in selected item(s) for Sections S/A3, S/A4 and/or S/A5 of listing above).
<input type="checkbox"/>	6. TV Brackets, projector mounts with a valid listing (see DSA IR A-5) and recreational equipment (e.g., playground structures, basketball backstops, etc.) (connections of such elements to superstructure elements using welding will require special inspection as noted in selected item(s) for sections S/A3, S/A4 and/or S/A5 located in the Steel/Aluminum category of listing above).

Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

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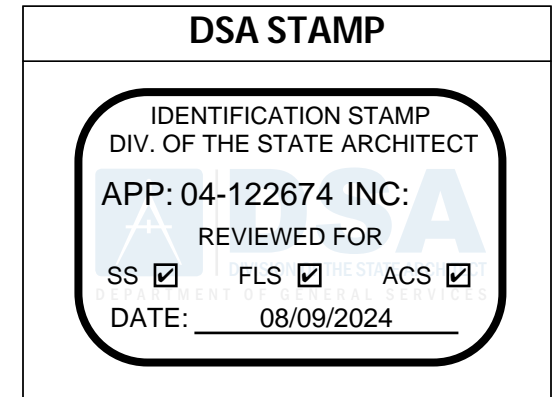
WELDING:	
<input type="checkbox"/>	7. Any support for exempt non-structural components given in CBC Section 1617A.1.18 (which replaces ASCE 7-16, Section 13.1.4) meeting the following: A) when supported on a floor/roof, <400# and resulting composite center of mass (including component's center of mass) $\leq 4'$ above supporting floor/roof, B) when hung from a wall or roof/floor, <20# for discrete units or <5 plf for distributed systems.

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS(SIGNATURE), 2022 CBC

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Name of Architect or Engineer in general responsible charge: Gino C. Bastinanon - C 27546 (Frick, Frick & Jette Architects)	
Name of Structural Engineer (When structural design has been delegated): Kevin R. Westervelt - S 5681 (KNA Structural Engineers, Inc.)	
Signature of Architect or Structural Engineer: 	Date: 8/9/2024

Note: To facilitate DSA electronic mark-ups and identification stamp application, DSA recommends against using secured electronic or digital signatures.



DSA 103-22: LIST OF REQUIRED VERIFIED REPORTS, CBC 2022

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1. Soils Testing and Inspection: Geotechnical Verified Report Form DSA 293

2. Structural Testing and Inspection: Laboratory Verified Report Form DSA 291

3. Concrete Batch Plant Inspection: Laboratory Verified Report Form DSA 291

4. Post-installed Anchors: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

5. Shop Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

6. Field Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

7. High-Strength Bolt Installation Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary heating.
 - 4. Temporary cooling.
 - 5. Temporary ventilation.
 - 6. Telephone service.
 - 7. Facsimile service.
 - 8. Temporary water service.
 - 9. Temporary sanitary facilities.

- B. Construction Facilities:
 - 1. Field offices.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Project identification.
 - 6. Fire prevention facilities.

- C. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Water control.
 - 5. Dust control.
 - 6. Erosion and sediment control.
 - 7. Noise control.

- D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.

- B. Provide temporary electric feeder from electrical service at location as directed by utility company. Do not disrupt Owner's use of service.

- C. Complement existing power service capacity and characteristics as required for construction operations.

- D. Provide power outlets, with branch wiring and distribution boxes located as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.

- E. Provide main service disconnect and over-current protection at convenient location.
- F. Permanent convenience receptacles may [not] be utilized during construction.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations to achieve minimum required lighting levels.
- B. Provide and maintain lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for required lighting levels.
- D. Maintain lighting and provide routine repairs.
- E. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY HEATING

- A. Existing facilities shall not be used. Do not use permanent equipment for temporary heating purposes.
- B. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.5 TEMPORARY COOLING

- A. Existing facilities shall not be used. Do not use permanent equipment for temporary cooling purposes.
- B. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations.
- C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.6 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Provide temporary fan units as required to maintain clean air for construction operations.

1.7 TELEPHONE SERVICE

- A. Provide, maintain and pay for telephone service to field office and Owner's/Inspector's field office at time of project mobilization. Inspector's office to have separate telephone lines.

1.8 FACSIMILE SERVICE

- A. Provide, maintain and pay for facsimile service with dedicated telephone line to field office at time of project mobilization.

1.9 TEMPORARY WATER SERVICE

- A. Provide, maintain and pay for suitable quality water service as required to maintain specified conditions for construction operations. Contractor may obtain water from existing fire hydrant if appropriate clearances are acquired and fees paid.
- B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation if required to prevent freezing.

1.10 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of project mobilization.

1.11 FIELD OFFICES

- A. Do not use existing facilities for field offices or for storage.
- B. Office: Weather-tight, with lighting, electrical outlets, heating, cooling and ventilating equipment and equipped with sturdy furniture, drawing rack and drawing display table.
- C. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- D. Locate offices minimum distance of 30 feet from structures.
- E. Construction: Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors.
 - 1. Construction: Structurally sound, secure, weather tight enclosures for office spaces. Maintain during progress of Work; remove at completion of Work.
 - 2. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
 - 3. Exterior Materials: Weather resistant, finished in one color.
 - 4. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.
- F. Environmental Control: Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfort conditions.
- G. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.
- H. Installation:
 - 1. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
 - 2. Parking: Two hard surfaced parking spaces for use by Owner and Architect, connected to office by hard surfaced walk.
 - 3. Employee Residential Occupancy: Not allowed on Owner's property.
- I. Maintenance And Cleaning:
 - 1. Janitorial services for offices; periodic cleaning and maintenance for office.
 - 2. Maintain approach walks free of mud, water, and snow.

J. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.12 VEHICULAR ACCESS

- A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
- C. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
- D. Provide unimpeded access for emergency vehicles. Maintain 26 feet wide driveways with turning space between and around combustible materials.
- E. Provide and maintain access to fire hydrants and control valves free of obstructions.
- F. Provide means of removing mud from vehicle wheels before entering streets.
- G. Do not use existing on-site roads for construction traffic.

1.13 PARKING

- A. Arrange for temporary dirt surface parking areas to accommodate construction personnel.
- B. When site space is not adequate, provide additional off-site parking.
- C. Do not allow heavy vehicles or construction equipment in parking areas.
- D. Do not allow vehicle parking on existing pavement.
- E. Designate one parking space for Owner.
- F. Permanent Pavements And Parking Facilities:
 - 1. Bases for permanent roads and parking areas may be used for construction traffic.
 - 2. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
- G. Maintenance: Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, and ice. Promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
- H. Mud From Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.14 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.

- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from site weekly and dispose legally and properly off-site. Debris may not be stockpiled.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.15 PROJECT IDENTIFICATION

- A. Provide 8 foot x 4 foot project sign of exterior grade plywood and wood frame construction, painted, with exhibit lettering by professional sign painter to Architect's design and colors.
- B. List title of Project, names of Owner, Architect, and Contractor.
- C. Erect on site at location established by Architect.
- D. Sign Painter: Experienced as professional sign painter for minimum three years.
- E. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.
- F. No other signs are allowed except those required by law.
- G. Maintenance: Maintain sign and supports clean, repair deterioration and damage.
- H. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.16 FIRE PREVENTION FACILITIES

- A. Prohibit smoking with buildings under construction.
- B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B: C UL rating.
 - 1. Provide one fire extinguisher at each building under construction.
 - 2. Provide minimum one fire extinguisher in every construction trailer and storage shed.
 - 3. Provide minimum one fire extinguisher on roof during roofing operations using heat producing equipment.

1.17 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way.
- C. Provide protection for plants designated to remain. Replace damaged plants.

- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- 1.18 ENCLOSURES AND FENCING
- A. Construction: Commercial grade chain link fence.
 - B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.
- 1.19 SECURITY
- A. Security Program:
 - 1. Protect Work and existing premises from theft, vandalism, and unauthorized entry.
 - 2. Initiate program at project mobilization.
 - 3. Maintain program throughout construction period until Owner occupancy.
- 1.20 WATER CONTROL
- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
 - B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- 1.21 DUST CONTROL
- A. Execute Work by methods to minimize raising dust from construction operations.
 - B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.
- 1.22 EROSION AND SEDIMENT CONTROL
- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - B. Minimize surface area of bare soil exposed at one time.
 - C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.
 - D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
 - E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- 1.23 NOISE CONTROL
- A. Provide methods, means, and facilities to minimize noise produced by construction operations.
- 1.24 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS
- A. Remove temporary utilities, equipment, facilities and materials prior to Final Application for Payment.

- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated on Drawings.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Product substitutions.
- F. Substitution submittal procedures.

1.2 PRODUCTS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- F. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

- H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTIONS

- A. The Contract is based upon the standards of quality established by those items of equipment and/or materials which are specifically identified in the Contract Documents.
- B. Limitations On Substitutions:
 - 1. Substitutions for products specified by proprietary name will be considered in accordance with substitutions Article of the General Conditions only when submitted on Architect's Substitution Request Form with complete data substantiating compliance of proposed substitution with Contract Documents within the time frame specified in the General Conditions.
 - 2. Consideration by Architect of a Substitution Request will be made in conformance with provisions of this Section.
 - 3. Substitutions will not be considered when requested or submitted directly by subcontractor or supplier.
 - 4. Substitutions will not be considered as a result of the failure to pursue the work promptly or coordinate activities properly.
 - 5. Burden of proof of merit of requested substitution is the responsibility of the Contractor.
 - 6. It is the sole responsibility of the Contractor to establish proper content of submittal for request for Substitutions. Incomplete submittals will be rejected.
 - 7. Owner shall receive full benefit of any cost reduction as a result of any request for Substitution.
 - 8. Architect's decision on Substitution Requests are final and do not require documentation or justification.
 - 9. When Substitution is not accepted, provide specified product.
 - 10. Substituted products shall not be ordered or installed without written acceptance.
- C. Consideration by Architect of Substitution Requests received after time frame specified in the General Conditions will only be made when one or more of the following conditions are met and documented:
 - 1. Specified item fails to comply with regulatory requirements.
 - 2. Specified item has been discontinued.
 - 3. Specified item, through no fault of the Contractor, is unavailable in the time frame required to meet project schedule.
 - 4. Specified item, through subsequent information disclosure, will not perform properly or fit in designated space.
 - 5. Manufacturer declares specified product to be unsuitable for use intended or refuses to warrant installation of product.
 - 6. Substitution would be, in the sole judgment of the Architect, a substantial benefit to the Owner in terms of cost, time, energy conservation, or other consideration of merit.

- D. Notwithstanding the above, the Architect may consider a Substitution Request after the time specified in the General Conditions, if in the sole discretion of the Architect, there appears to be just cause for such a request. The acceptance of such a late request does not waive any other requirement as stated herein.
- E. Regulatory Requirements:
 - 1. It shall be the responsibility of the Contractor to obtain all regulatory approvals required for proposed Substitutions.
 - 2. All regulatory approvals shall be obtained for proposed Substitutions prior to submittal of Substitution Request to Architect.
 - 3. Substitution of materials or work procedures which affect the health, safety and welfare of the public shall have prior approval of the Division of the State Architect (DSA) field representative.
 - 4. All costs incurred by the Owner in obtaining regulatory approvals for proposed Substitutions, including the costs of the Architect and any authority having jurisdiction over the project shall be reimbursed to the Owner by means of a Change of Order. Costs of these services shall be reimbursed regardless of final acceptance or rejection of substitution.
- F. A Substitution Request constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for Substitution as for specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 - 5. Will reimburse Owner by means of Change Order to the Contract for the cost of Architect's review or redesign services associated with re-approval by authorities having jurisdiction.
- G. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents. Review of shop drawings does not constitute acceptance of Substitutions indicated or implied on Shop Drawings.

1.7 SUBSTITUTION SUBMITTAL PROCEDURES

- A. Submit six copies of each request for Substitution for consideration. Limit each request to one proposed Substitution.
- B. Submit request with Architect's Substitution Request Form. Form may be obtained at the office of the Architect. Substitution requests received without request form will be returned without review.
- C. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
- D. Request to include sufficient data so that direct comparison of proposed Substitution can be made.
- E. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents. Include the following minimum information, as appropriate:
 - 1. Statement of cause for substitution request.
 - 2. Identify product by specification section and article number.
 - 3. Provide manufacturer's name, address, and phone number. List fabricators, suppliers, and installers as appropriate.

4. List similar projects where proposed substitution has been used, dates of installation and names of Architect and Owner.
 5. List availability of maintenance services and replacement materials.
 6. Documented or confirmation of regulatory approval.
 7. Product Data, including drawings and descriptions of products.
 8. Fabrication and installation procedures.
 9. Samples of proposed Substitutions.
 10. Itemized comparison of significant qualities of the proposed Substitution with those of the product specified. Significant qualities may include size, weight, durability, performance requirements and visual effects.
 11. Coordination information, including a list of changes or modifications needed to other items of work that will become necessary to accommodate proposed Substitution.
 12. Statement on the Substitutions effect on the construction schedule.
 13. Cost information including a proposal of the net change, if any, in the Contract sum.
 14. Certification that the Substitution is equal to or better in every respect to that required by the Contract Documents and that Substitution will perform adequately in the application intended
 15. Waiver of right to additional payment or time that may subsequently become necessary because of failure of Substitution to perform adequately.
- F. Inadequate warranty, vagueness of submittal, failure to meet specified requirements, or submittal of insufficient data will be cause for rejection of Substitution Request.
- G. Architect will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SUBSTITUTION REQUEST FORM

TO: FF & J ARCHITECTS, INC.

PROJECT: _____

SPECIFIED ITEM:	SECTION	PAGE	PARAGRAPH	DESCRIPTION
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The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: _____

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the requests; applicable portions of the data are clearly identified.

Attached data also includes description of changes to Contract Documents which proposed substitution will require for its proper installation.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitution does not affect dimensions shown on Drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailing, and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item.

Submitted by:

Signature: _____

For use by FFJ

Firm: _____

Accepted

Accepted as noted

Address: _____

Not Accepted

Received too late

By: _____

Date: _____

Date: _____

Telephone: _____

Remarks: _____

Attachments:

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Adjusting.
- F. Protecting installed construction.
- G. Project record documents.
- H. Operation and maintenance data.
- I. Spare parts and maintenance products.
- J. Product warranties.
- K. Maintenance service.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect's review.
- B. Requirement Preparatory to Project Acceptance:
 - 1. Certifications delivered to Architect that no new materials containing asbestos have been included in the work.
 - 2. Temporary facilities shall be removed from site as specified in Section 01 50 00 Temporary Facilities and Controls.
 - 3. Building and site shall be thoroughly cleaned as specified in General Conditions and in this Section.
 - 4. Plumbing and mechanical equipment shall operate quietly and free from vibration. Properly adjust, repair, balance, or replace equipment producing objectionable noise or vibration in occupied areas of building. Provide additional brackets, bracing, etc., to prevent objectionable noise or vibration. Systems shall operate without humming, surging, or rapid cycling. Balance reports are required before Mechanical Engineer will prepare their Punch List.
 - 5. Operating instructions for equipment shall be properly mounted and posted.
 - 6. Record drawings shall be completed, signed by Contractor and Inspector and submitted to Architect as specified in General Conditions.
 - 7. Maintenance instructions and manuals shall be submitted to Architect as specified in General Conditions.

8. Guarantees and warranties shall be submitted to Architect as specified in General Conditions. Contractor's Final Verified Report (DSA Form SSS-6) and other Reports and Affidavits required by the Division of the State Architect shall be submitted.
9. Contractor shall notify Architect when Contractor, with concurrence of Inspector, feels project is complete enough to prepare Punch List. Architect will then notify Mechanical and Electrical Engineers to make their inspections and prepare Punch Lists. Mechanical and Electrical Punch Lists must be completed before Architect will make his Punch Lists.

C. Project Acceptance:

1. After requirements preparatory to project acceptance have been completed as herein specified, Contractor shall notify Architect to perform acceptance tour. Notice shall be given at least three days in advance of the time the acceptance tour is to be performed.
2. Contractor or his principal superintendent, authorized to act in behalf of Contractor, shall accompany Architect and Inspector on acceptance tour, as well as any principal subcontractors that Architect may request to be present.
 - a. If work has been completed in accordance with Contract Documents, and no further corrective measures are required, Architect will recommend that Owner accept Project and file Notice of Completion.
 - b. If work has been substantially completed in accordance with Contract Documents, and only minor corrective measures are required, Architect will recommend that Owner conditionally accept Project and file Notice of Completion based upon Contractor's assurance that corrective measures will be completed within shortest practicable time period.
 - c. If work has not been substantially completed in accordance with Contract Documents, and several or many corrective measures are still required, Architect will recommend that Owner not accept project and not file Notice of Completion. Instead, based on information gathered from acceptance tour, Contractor will be required to complete all corrective measures and then call for another project acceptance tour following procedure outlined above. Owner will compensate Architect for additional acceptance tour and deduct amount paid from final payment to Contractor.
3. Upon acceptance of Project by Owner, Contractor shall submit his request for final payment, less retention. Retention payment will not be made by Owner until 35 days after filing of Notice of Completion.
 - a. Retention payment will not be made until Contractor has filed the required DSA Form 6 to the Architect.
 - b. Should any corrective measures remain incomplete at time retention is due, Contractor shall provide Owner with Cashier's Check(s) in exchange for retention. Cashiers Check(s) shall be in an amount twice the agreed estimated cost to accomplish the corrective measures to assure that Owner will have sufficient funds to accomplish work by others should Contractor not complete corrective measures in a reasonable amount of time.

D. Provide submittals to Architect that are required by authorities having jurisdiction.

E. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. At completion of work, remove marks, stains, fingerprints, dust, dirt, and paint drippings resulting from work of this Project. Wash tile, plumbing and other fixtures clean. Clean and polish hardware and other unpainted metals. Polish transparent and glossy surfaces. Remove temporary labels, tags and paper covering. Vacuum carpeted and soft surfaces.

- C. Cleaning, polishing, sealing, waxing and other such finish operations indicated on Drawings or required in specifications shall be taken to indicate required condition at time of acceptance of work under Contract.
- D. Before final acceptance, employ professional window cleaners to clean interior and exterior glass surfaces, plastic and mirrors exposed to view of putty, paint materials, stains and dirt, without scratching or injuring plastic and glass. Leave work bright, clean and polished.
- E. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- F. Replace filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, and drainage systems.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Owner seven days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.

- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual Sections.

1.6 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.7 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work in contrasting color:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store Record Documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section in contrasting color ink, description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item in contrasting color ink to record actual construction including:
 - 1. Measured depths of foundations in relation to finish floor datum.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimensions and detail.
5. Details not on original Contract Drawings.

G. Submit documents to Architect with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit two sets of data prior to final inspection, bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Engineers, Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions, arranged by specification Section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photocopies of warranties.
- F. Provide data for:
 1. Mechanical Equipment and Controls - Division 23.
 2. Energy Management System - Division 23.
 3. Electrical System - Division 26.
 4. Security System - Division 28.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification Sections.

- B. Deliver to Owner; obtain receipt prior to final payment.

1.11 PRODUCT WARRANTIES

- A. Obtain warranties executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time Of Submittals:
 - 1. Make submittals within ten days after Notice of Completion, prior to final Application for Payment.
 - 2. For items of Work for which acceptance is delayed beyond Notice of Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.12 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification Sections during warranty period.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

The following items are required to be turned in before Final Payment is made by the District. Failure to submit any of the required documents/materials will delay final payment. Organize documents and assemble in order as listed below as applicable. To be delivered to Frick, Frick, & Jetté Architects for review.

	<u>Attached</u>		<u>Received</u>	
	Yes	No	Yes	No
Change Order/Amendment Certification (form provided)	___	___	___	___
Releases for each 20 Day California Preliminary Notice (Copies enclosed)	___	___	___	___
Releases for each Unconditional Waiver and Release	___	___	___	___
Releases for each Conditional Waiver and Release	___	___	___	___
All AS-BUILTS/Record Documents (as applicable)	___	___	___	___
All Equipment Manuals	___	___	___	___
All Extra Stock (as applicable)	___	___	___	___
Release for all Stop Notices	___	___	___	___
Warranty and Guarantee Certificate (sample provided)	___	___	___	___
Manufacturer's Engineers Close-out Documents (as applicable)	___	___	___	___
Final Verified Report (as applicable)	___	___	___	___
Copy of key receipt from Maintenance (as applicable)	___	___	___	___
Consent of surety for release of final payment	___	___	___	___
Certification of staff training (as applicable) (Fire Alarm, Stage, Pocket Table, Kitchen Equipment, Etc.)	___	___	___	___

SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolishing designated building equipment and fixtures.
 - 2. Demolishing designated construction.
 - 3. Cutting and alterations for completion of the Work.
 - 4. Removing designated items for reuse and Owner's retention.
 - 5. Protecting items designated to remain.
 - 6. Removing demolished materials.
 - 7. Products and installation for patching and extending Work.
 - 8. Transition and adjustments.
 - 9. Repair of damaged surfaces, finishes, and cleaning.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Demolition Schedule: Indicate overall schedule and interruptions required for utility and building services.
- C. Shop Drawings:
 - 1. Indicate demolition and removal sequence.
 - 2. Indicate location and construction of temporary work.

1.3 QUALITY ASSURANCE

- A. Conform to 2022 CBC for demolition work, products requiring electrical disconnection and re-connection, and.
- B. Notify owner, in writing immediately when hazardous or contaminated materials are discovered.

1.4 SEQUENCING

- A. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

1.5 SCHEDULING

- A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.

- B. Schedule Work to coincide with new construction. School District provided schedule.
- C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owners operation and student and staff operations in adjoining spaces.
- D. Field conditions: take into consideration as necessary work, all obvious existing conditions, and installations in the area of new work as though they were completely shown or described. Accept the area of new work as it exists and clear obstructions to the work.
- E. Examine the site and all conditions and limitations thereon and thereabouts. All proposals shall take into account all such conditions and limitations whether or not the same are specifically shown or mentioned in any of the Contract Documents and every proposal shall be construed as including whatever sums are needed to complete the work in every part as shown, described, or reasonably required or implied, and attain the completed conditions contemplated by the Contract.
- F. Glass: Provide such protection as may be required to prevent glass breakage. At no additional cost, replace in kind all glass damaged during demolition. Unforeseen conditions: Include as part of this Work miscellaneous cutting and patching necessitated as a result of unforeseen conditions and the reworking of abutting surfaces as required to make new Work join and match existing surfaces to remain. No extra payments based on the plea of unforeseen conditions will be allowed.
- G. Take careful note of the fact that the premise and activities will NOT be open to “business-as-usual” during the life of this Contract.
- H. Phasing of the work: Confer with the Owner as to the sequencing and phasing of the performance of the various parts of the work. Cooperate fully to the end that certain facilities and services are maintained in operation until immediately before their removal is required to permit installation of the work.
- I. Noise control: Carry on all work in a manner which will produce the least amount of noise. Instruct all workmen in noise control procedures.
- J. Perform noisy, malodorous, or dusty, work: Between hours of 3 P.M. and 5 P.M.
- K. Coordinate utility and building service interruptions with Owner.
- L. Do not disable or disrupt building fire or life safety systems without three days prior written notice to Owner.
- M. Schedule tie-ins to existing systems to minimize disruption.
- N. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.6 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent [and occupied] building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

PART 2 PRODUCTS

2.1 PRODUCTS

- A. Partitions: Remove partition finish, studs, plates and sills. Where only a partial run is removed, cut back finish material to the center line on the next adjacent support to remain. Leave remaining material with a clean terminal line with no loose material adhering.
- B. Concrete, asphalt paving, and masonry: Saw cut not less than 4 inches at line of removal. Break out sections to be removed. Chip back face behind saw cut line.
- C. Plaster: Cut back to sound plaster on straight lines, and back-bevel edges of remaining plaster. Trim and prepare existing lath for tying new lath.
- D. Roofing: Remove only to the extent necessary for the new required roof penetrations, if any.
- E. Miscellaneous materials: Cut to straight lines or joints.

2.2 PRODUCTS FOR PATCHING AND EXTENDING WORK

- A. New materials: As specified in product Sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspection and testing Products where necessary, referring to existing Work as a standard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Notify affected utility companies before starting work and comply with their requirements.
- B. Mark location and termination of utilities.

- C. Erect, and maintain temporary barriers and security devices including warning signs and lights, and similar measures, for protection of the students, staff and existing improvements indicated to remain.
- D. Erect and maintain weatherproof closures for exterior openings.
- E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.
- F. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.
- G. Provide appropriate temporary signage including signage for exit or building egress.
- H. Do not close or obstruct building egress path.
- I. Do not disable or disrupt building fire or life safety systems without [3] days prior written notice to Owner and Architect.
- J. Verify that demolition is complete and areas are ready for installation of new Work.
- K. Beginning of restoration Work means acceptance of existing conditions.
- L. Cut, move, or remove items as necessary for access to alterations and renovations Work. Replace and restore at completion.
- M. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, deteriorated masonry and concrete. Replace materials as specified for finished Work.
- N. Remove debris and abandoned items from area and from concealed spaces.
- O. Prepare surface and remove surface finishes to provide for proper installation of new work and finishes.
- P. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- Q. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patched Work to match existing adjacent Work in texture and appearance.
- R. When finished surfaces are cut so that a smooth transition with new work is not possible, request instructions from Architecture.

3.2 SALVAGE REQUIREMENTS

- A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.
- B. Tag components and equipment Owner designates for salvage.
- C. Protect designated salvage items from demolition operations until items can be removed.
- D. Carefully remove building components and equipment indicated to be salvaged.
- E. Disassemble as required to permit removal from building.
- F. Package small and loose parts to avoid loss.
- G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.
- H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.
- I. Deliver salvaged items to Owner within 2 mile radius of site. Obtain signed receipt from Owner.

3.3 DEMOLITION

- A. Conduct demolition to minimize interference with adjacent [and occupied] building areas.
- B. Maintain protected egress from and access to adjacent existing buildings at all times.
- C. Do not close or obstruct roadways or sidewalks without permits.
- D. Demolish in orderly and careful manner. Protect existing improvements, [supporting structural members and adjacent surfaces.
- E. Carefully remove building components indicated to be reused.
 - 1. Disassemble components as required to permit removal.
 - 2. Package small and loose parts to avoid loss.
 - 3. Mark components and packaged parts to permit reinstallation.
 - 4. Store components, protected from construction operations, until reinstalled.
- F. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site. Dispose of in a legal manner.

- G. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.
- H. Remove temporary Work.
- I. Check drawings carefully and thoroughly investigate existing building construction. Furnish and install all shoring and bracing required or implied to positively protect all structural and non-structural elements of the building. Material used shall be adequate to support anticipated loads with properly calculated margin of safety. Remove all shoring and bracing when new construction is safely in place.
- J. Where openings are cut over-size or in in-proper location, the excess removed material shall be replaced with new. Such repair work may entail the installation of new dowels and/or the installation of new concrete, masonry, or other materials as may be required.
- K. Temporary partitions for the protection of the existing facility, contents and any new work of this Contract against dust, weather, damage and noise are to be in place and maintained. Relocate temporary partitions from time to time as work progresses.
- L. Items of existing work, indicated to remain upon completion of the Contract, but which require removal to complete the work, shall be carefully removed and replaced upon completion. The replaced work shall match its condition at the start of the work unless required by the Drawings, elsewhere herein, or in the various sections affected, to be done otherwise.
- M. Leave all spaces broom clean with all ledges and corners properly cleaned.
- N. Unless otherwise indicated, patch and finish surfaces as necessary to match existing, and in accord with the requirements of the various Specifications Sections.

3.4 ADJUSTMENTS

- A. Where a change of plane of 1/8 inch or more occurs, request instructions from Architect.
- B. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
- C. Fit work at penetrations of surfaces.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formwork for cast-in place concrete.
 - 2. Shoring, bracing, and anchorage.
 - 3. Openings for other affected work.
 - 4. Form accessories.
 - 5. Form stripping.
- B. Related Sections:
 - 1. Section 03 20 00 - Concrete Reinforcing.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.
 - 3. Section 05 50 00 - Metal Fabrications: Product requirements for metal fabrications for placement by this Section.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
 - 2. ACI 301 - Specifications for Structural Concrete.
 - 3. ACI 318 – Building Code Requirements for Reinforced Concrete.
 - 4. ACI 347 - Guide to Formwork for Concrete.
- B. American Forest and Paper Association:
 - 1. AF&PA - National Design Specifications for Wood Construction.
- C. The Engineered Wood Association:
 - 1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.
- D. ASTM International:
 - 1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- E. West Coast Lumber Inspection Bureau:
 - 1. WCLIB - Standard Grading Rules for West Coast Lumber.
- F. 2022 California Building Code, Chapter 19A.

1.3 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing in accordance with ACI 301 to conform to design and applicable code requirements to achieve concrete shape, line and dimension as indicated on Drawings.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301 and ACI 347.

- B. For wood products furnished for work of this Section, comply with AF&PA.

1.5 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2022 California Building Code.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

- A. Plywood: APA/EWA PS 1-84, 3/4 inch, 5-ply, C-B grade, Structural I; Exterior features.
- B. Lumber Forms: "Standard" Grade Douglas Fir, conforming to WCLIB Standard Grading Rules for West Coast Lumber with grade stamp clearly visible. Surface boards on four sides.

2.2 PREFABRICATED FORMS

- A. Tubular Column Type: Round, spirally wound laminated fiber material, surface treated with release agent, non-reusable, sizes as indicated on Drawings.

2.3 FORMWORK ACCESSORIES

- A. Form Ties: Snap-off type, galvanized metal, adjustable length, cone type, 1 inch back break dimension, free of defects capable of leaving holes larger than 1 inch in concrete surface.
- B. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.
- C. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
 - 1. Manufacturers:
 - a. Arcal Chemical Corporation Arcal-80.
 - b. Industrial Synthetics Company Synthex.
 - c. Nox-Crete Company Nox-Crete Form Coating.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
- D. Corners: Fillet and Chamfer, wood strip type; 1/2 x 1/2 inch size; maximum possible lengths. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- F. Bituminous Joint Filler: ASTM D1751.

- G. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.

3.2 INSTALLATION

- A. Earth Forms:
 - 1. Obtain Architect's approval prior to the use of earth forms.
 - 2. Trench earth forms neatly, accurately, and 2 inches wider than footing widths indicated on Drawings.
 - 3. Hand-trim sides and bottom of earth forms.
 - 4. Construct wood edge strips at top of each side of trench to secure reinforcing and prevent trench from sloughing.
 - 5. Form sides of footings where earth sloughs.
 - 6. Tamp earth forms firm and clean forms of debris and loose material before depositing concrete.
 - 7. Remove loose dirt prior to placing concrete.
- B. Formwork - General:
 - 1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
 - 2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
 - 4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
 - 5. Complete wedging and bracing before placing concrete.
- C. Forms for Smooth Finish Concrete:
 - 1. Use steel, plywood or lined board forms.
 - 2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
 - 3. Install form lining with close-fitting square joints between separate sheets without springing into place.
 - 4. Use full size sheets of form lines and plywood wherever possible.
 - 5. Tape joints to prevent protrusions in concrete.
 - 6. Use care in forming and stripping wood forms to protect corners and edges.
 - 7. Level and continue horizontal joints.
 - 8. Keep wood forms wet until stripped.
- D. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301 & ACI 347.

- E. Provide bracing to ensure stability of form work. Strengthen form work liable to be over stressed by construction loads.
- F. Do not displace or damage vapor retarder placed by Section 03 30 00.
- G. Minimize form joints. Symmetrically align joints and make watertight to prevent leakage of mortar.
- H. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- I. Install fillet and chamfer strips on external corners of columns and walls.
- J. Reuse of formwork shall be subject to the inspection and approval of the Architect and/or Structural Engineer. Do not patch formwork. Reuse of forms without proper approval shall be grounds for rejection of work.
- K. Construct forms of new and clean materials for all finished exposed surfaces except otherwise approved by the Inspector.
- L. Provide all openings in concrete to accommodate mechanical and electrical work. Items required to be incorporated in concrete shall be accurately placed and supported on form work.

3.3 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces are indicated to receive applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
- D. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse, if approved. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Install formed openings where required for items to be embedded in or passing through concrete work.
- B. Locate and set in place items required to be cast directly into concrete.
- C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories straight, level, and plumb in accordance with manufacturer's instructions. Ensure items are not disturbed during concrete placement.
- E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

- F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
- G. Form Ties:
1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
 2. Place ties at least 1 inch away from finished surface of concrete.
 3. Leave inner rods in concrete when forms are stripped.
 4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.
- H. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.
- I. Construction Joints:
1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
 2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
 3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
 4. Arrange joints in continuous line straight, true and sharp.
- J. Embedded Items:
1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
 2. Do not embed wood or uncoated aluminum in concrete.
 3. Obtain installation and setting information for embedded items furnished under other Specification sections.
 4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
- K. Openings for Items Passing Through Concrete:
1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
 2. Coordinate work to avoid cutting and patching of concrete after placement.
 3. Perform cutting and repairing of concrete required as result of failure to provide required openings.
- L. Screeds:
1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
 2. Slope slabs to drain where required or as shown on Drawings.
 3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.
- M. Scream Supports:
1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane.
 2. Staking through membrane is not permitted.
- N. Cleanouts and Access Panels:
1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
 2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been permitted by Inspector.
- B. Do not damage concrete surfaces during form removal. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Remove formwork progressively so no unbalanced loads are imposed on structure.
- D. Remove formwork in the same sequence as concrete placement to achieve similar concrete surface coloration.
- E. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- F. Store reusable forms for exposed architectural concrete to prevent damage to contact surfaces.
- G. Leave forms in place for minimum number of days as specified in ACI 347.
- H. Re-shore structural members due to design requirements or construction conditions to permit successive construction.

3.7 CLEANING

- A. Clean forms to remove foreign matter as erection proceeds.
- B. Ensure that water and debris drain to exterior through clean-out ports.

3.8 ERECTION TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301 and as follows:
 - 1. Variation from plumb in lines and surfaces of columns, piers, walls and arises shall not exceed 1/8 inch in 10 feet; 1/4 inch in any story or 10 feet maximum; 3/8 inch in 40 feet or more.
 - 2. Variations from level or grades indicated in floors, ceilings, beam soffits and arises shall not exceed 1/8 inch in 10 feet; 1/4 inch in any bay or 20 feet maximum. For exposed lintels, sills, parapets, canopies, overhangs and the like, not to exceed 1/4 inch in 20 feet.
 - 3. Variation from linear building lines from established position on plan and related position of columns, walls and partitions shall not exceed 1/4 inch in any bay or 20 feet.
 - 4. Variation in size and location of sleeves, floor openings and wall openings, shall not exceed 1/4 inch.

5. Variations in footings: Dimensions shall lay between minus 1/2 inch and plus 2 inches. Misplacement or eccentricity shall not exceed 2% of footing width in direction of misplacement, but not over 2 inches.
6. Variation in steps shall not exceed 1/8 inch in rise or 1/4 inch in tread in a flight, and in consecutive steps 1/16 inch in rise and 1/8 inch in tread.

B. Camber slabs and beams in accordance with ACI 301.

3.9 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.
- D. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Reinforcing steel bars.
 - 2. Welded wire fabric.
 - 3. Reinforcement accessories.
- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 318 – Building Code Requirements for Reinforced Concrete
 - 3. ACI SP-66 - ACI Detailing Manual.
- B. ASTM International:
 - 1. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - 2. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 3. ASTM A 1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- C. American Welding Society:
 - 1. AWS A5.1 - Mild Steel Covered Arc-Welding Electrodes.
 - 2. AWS D1.4 - Structural Welding Code - Reinforcing Steel.
- D. Concrete Reinforcing Steel Institute:
 - 1. CRSI - Manual of Standard Practice.
 - 2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.
 - 1. Submit certified copies of mill test report of supplied reinforcement materials indicating physical and chemical analysis.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI - Manual of Standard Practice and ACI 301.
- B. Perform Work in accordance with 2022 California Building Code.

1.5 QUALIFICATIONS

- A. Welders: AWS qualified within previous 12 months.

1.6 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate with placement of formwork, formed openings and other Work.

1.7 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 41 00 and as required by the Division of the State Architect and Project Inspector.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Welded Plain Wire Fabric: ASTM A185; in flat sheets; unfinished.
- B. Deformed Reinforcement: ASTM A615/A615M; 60 ksi yield strength, steel bars, unfinished.
- C. Weldable Deformed Reinforcement: ASTM A706/A706M; 60 ksi yield strength, steel bars, unfinished.
- D. Steel Dowels: Of same grade as bars to which dowels are to be connected.

2.2 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type, ASTM 1064/1064M.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor retarder puncture.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic-coated steel type; size and shape to meet Project conditions.
- D. Electrodes for Welding: E90 series, low hydrogen having a minimum yield point of 90,000 psi.

2.3 FABRICATION

- A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice, providing concrete cover specified in Section 03 30 00.
- B. All reinforcement shall be fabricated to the shapes detailed on the drawings in accordance with sound engineering practice. Any bending or straightening shall be done only with an approved bar bender in a manner that will not injure the material. Bars with kinks or bends not shown on the drawings shall not be used. Exposed reinforcement bars intended for bonding with future extensions shall be protected against displacement by others. Bars shall not be bent out of the way unless approved by the Inspector and Structural Engineer.

- C. Size of bends for stirrups, ties and hooks shall comply with ACI 318-19 Section 25.3, U.N.O. on drawings.
- D. Bends for other bars, except hooks, shall be made around a pin having a diameter not less than six times the minimum thickness of the bar, except that for bars larger than one inch thick, the pin shall be not less than eight times the minimum thickness of the bar. All bars shall be bent cold.
- E. Fabricate column reinforcement with offset bends at reinforcement splices.
- F. Weld reinforcement in accordance with AWS D1.4.
- G. Locate reinforcement splices not indicated on Drawings, at point of minimum stress. Obtain approval of location of splices with Architect/S.E.O.R. prior to installation.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
 - 1. Do not weld crossing reinforcement bars for assembly except as permitted by Architect/Engineer.
- B. Do not displace or damage vapor retarder placed by Section 03 30 00.
- C. Accommodate placement of formed openings.
- D. Conform to 2022 California Building Code for concrete cover over reinforcement, U.N.O. on drawings.
- E. Steel reinforcement shall be clean at the time concrete is placed around it free from rust scale, loose mill scale, oil paint or any coating that will destroy or reduce the bond between steel and concrete.
- F. Particular care shall be taken in placing and securing reinforcement to maintain proper clearance between parallel bars and between bars and forms during the placing of concrete. Where dowels or bars extend through construction joints, they shall be secured firmly in position to avoid displacement during the placing of concrete. Before any concrete pouring operation is started, all reinforcement shall be in place and shall be inspected and approved.
- G. The clear distance between parallel reinforcing bars shall be not less than 1-1/2 times the nominal diameter of the bars, but in no case shall the distance be less than 1-1/2 inches nor less than 1-1/3 times the maximum size aggregate.
- H. Metal accessories shall be provided as required to properly install all reinforcement in accordance with the CSRI - Manual of Standard Practice.
- I. In all footings, the reinforcing steel shall be supported from templates, from forms or on pre-cast concrete blocks. Bricks shall not be used to support reinforcing steel.
- J. Reinforcing steel for slabs on ground or fill shall be supported on pre-cast concrete blocks of proper size, space so as to hold the steel at proper height in the slabs.

- K. At those surfaces of footings and other principal structural members in which the concrete is deposited directly against the ground, steel reinforcement shall have a minimum covering of three inches of concrete. At other surfaces where concrete may be exposed to the ground, but is placed in forms, the metal reinforcement shall be protected by at least two inches of concrete. At surfaces which are to be exposed to the weather, reinforcing bars more than 5/8 inch in diameter shall be protected by at least 2 inches of concrete, and bars 5/8 inch or less in diameter shall be protected by at least 1-1/2 inches of concrete.
- L. Steel reinforcement in members not exposed to the ground or weather shall be protected by not less than 3/4 inch of Concrete protection for reinforcement shall in all cases be at least equal to the diameter of the bars.
- M. Splices in Reinforcement:
 - 1. Horizontal Bars: All reinforcing steel shall be accurately spaced and secured in place with annealed wire not smaller than 16 gage. Wall and slab steel shall be wired together at all points where bars cross. Splices in adjacent bars shall be separated by at least 4 feet except where otherwise specifically shown on the drawings. Bars shall be wired together at all laps, splice lengths shall be as indicated on structural drawings, U.N.O.
- N. Welding of Reinforcing Bars: Welding shall be in conformity with ANSI/AWS D1.4. The carbon equivalent and welding procedures shall conform to 2022 California Building Code, Section 1903A.5.3. The inspection of welding reinforcing bars shall conform to Section 01 41 00 and the Projects DSA 103 Form.
- O. As concrete in slabs in poured, lift mesh reinforcement.

3.2 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Field inspection and testing will be performed by Project Inspector and Owner's testing laboratory in accordance with 2022 California Building Code.
- C. Provide free access to Work and cooperate with appointed firm.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete for the following:
 - 1. Foundation walls and footings.
 - 2. Slabs on grade.
 - 3. Control, expansion and contraction joint devices.
 - 4. Equipment pads.
 - 5. Light pole base.
 - 6. Thrust blocks.

- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories: Formwork and accessories.
 - 2. Section 03 20 00 - Concrete Reinforcing.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 117 – Specification for Tolerances for Concrete Construction and Materials (ACI 117-10) and Commentary-Reapproved 2015ACI 302.1R – Guide to Concrete Floor and Slab Construction
 - 2. ACI 301 - Specifications for Structural Concrete.
 - 3. ACI 302.2R – Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
 - 4. ACI 304 – Recommended Practice for Measuring, Mixing and Placing Concrete.
 - 5. ACI 305R - Hot Weather Concreting.
 - 6. ACI 306.1 - Standard Specification for Cold Weather Concreting.
 - 7. ACI 308.1 - Standard Specification for Curing Concrete.
 - 8. ACI 318 – Building Code Requirements for Reinforced Concrete.
 - 9. ACI 347 – Recommended Practice for Concrete Formwork

- B. ASTM International:
 - 1. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - 2. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 4. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
 - 5. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
 - 6. ASTM C150 - Standard Specification for Portland Cement.
 - 7. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete
 - 8. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
 - 9. ASTM C595 – Standard Specification for Blended Hydraulic Cements
 - 10. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
 - 11. ASTM C685 – Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing
 - 12. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete.

13. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
14. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
15. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
16. ASTM E329 – Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
17. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
18. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
19. ASTM F1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor

C. 2022 California Building Code, Chapters 17A and 19A.

1.3 PERFORMANCE REQUIREMENTS

A. Vapor Barrier Permeance: Water Vapor Permeance, ASTM F 1249 / E 154, Section 7: 0.01 perms or less.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on joint devices, attachment accessories, admixtures and instructions for color additives.

C. Design Data:

1. Submit design mix for each class of concrete, prepared by a California Registered Civil Engineer, to Architect for approval. Include historical test data, admixture data, name, address and telephone number of batch plant, mix ingredients and proportions.
2. The compressive strength of each class of concrete shall be proportioned per CBC 1705A.3 – Table 1705A.3, Item 5; CBC 1910A.1, and ACI 318 – Section 26.4.3.

D. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

E. Samples for Concrete Color Selection: Color additive manufacturer's color chart or sample chip set; indicate color additive number and required dosage rate.

F. Samples for Verification of Concrete Color: Sample chips of specified colors indicating color additive numbers and required dosage rates.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.6 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

- B. Conform to ACI 305 and ACI 318-19, Section 26.5.5 when concreting during hot weather.
- C. Conform to ACI 306.1 and ACI 318-19, Section 26.5.4 when concreting during cold weather.
- D. Acquire cement and aggregate from one source for Work.
- E. Mock-Up: Provide full-scale mock-up to demonstrate methods of obtaining consistent visual appearance of colored concrete.
 - 1. Construct at least one month before start of actual work, using materials and methods to be used in actual work.
 - 2. Paving: 4 by 4 feet.
 - 3. Locate mock-up on site.
 - 4. Accepted mock-up constitutes visual standard for work.
 - 5. Remove mock-up when no longer required for comparison with finished work.

1.7 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

1.8 TESTS

- A. Testing and analysis of concrete will be performed under provisions of Section 01 41 00 and as required by the Division of the State Architect and Project Inspector.
- B. Owner's Inspector will take cylinders and perform slump tests in accordance with ACI 301 and deliver to Testing Laboratory.
- C. Three cylinders of each class of concrete placed each day shall be taken for every 50 cubic yards of concrete, or fraction thereof, nor less than 2,000 square feet of surface area of slabs, walls or mat ftg. for strength tests.
- D. Samples for strength tests for each class of concrete shall be taken for seven-day tests at the beginning of the concrete work or whenever the mix or aggregate is changed.
- E. Tests of cement and aggregates will be performed by Testing Laboratory to ensure conformance with requirements stated herein.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: Portland Cement shall conform to ASTM C-150, Type II. Cement used for concrete in contact with soil shall conform to ASTM C-150, Type V.
- B. Normal Weight Fine and Coarse Aggregates: ASTM C33.
- C. Water: Clean, potable, without deleterious amounts of chloride ions and not detrimental to concrete.

2.2 ADMIXTURES

- A. Air Entrainment: ASTM C260
- B. Water Reducer: ASTM C 494/C 494M, Type A.
- C. Hydration Controlling Admixture: MasterSet Delvo

2.3 ACCESSORIES

- A. Vapor Barrier: ASTM E1745 Class A; 15 mil thick clear polyethylene film; type recommended for below grade application. Furnish joint tape recommended by manufacturer.
- B. Non-Shrink Grout and Drypack: ASTM C1107, Grade A; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,700 psi in 48 hours and 8,000 psi in 28 days.
- C. Sand Fill: Natural river or bank sand free of silt, clay, loam, friable or soluble materials or organic matters, all passing the No. 4 sieve and only 5% passing the No. 200 sieve.
- D. Waterproof, Seal and Cure Application: Wherever concrete slab is covered with resilient flooring including sheet vinyl and vinyl cementitious tile, wood flooring, carpet with a vinyl, rubber or unitary type backing, sports flooring or other moisture sensitive flooring as shown on the drawings.
 - 1. Acceptable Manufacturers:
 - a. Synthetic10-S as manufactured by Synthetics Intl., (866) 646-0356
 - b. CS2000 as manufactured by Creteseal and distributed by OBEX, (844) 265-3535.
 - c. Curranseal PMC3300 by Curranseal, (714) 641-1121.
 - d. Substitutions: Under provisions of Section 01 33 00.
 - 2. Apply in accordance with manufacturer's written documentation and this Specification.
 - 3. Labor and Materials Warranty: 15 years backed by a \$1,000,000 Insurance Policy.
 - 4. A trained applicator shall apply Waterproof, Seal and Cure Application, or a technician must be on site during the spraying applications for verification to receive the 15 year warranty on floor coverings.
 - 5. When a floor covering system is installed on a slab treated with the product according to manufacturer's instructions, the manufacturer shall warrant the floor covering system against delamination due to negative, ground originated moisture migration or moisture-born contaminants for a period of 15 years from the date of original installation. The warranty shall cover labor and materials necessary to replace the floor covering system if repair cannot be made.

2.4 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/4 inch thick; tongue and groove profile.
- B. Construction Joint Devices: Integral galvanized steel; formed to tongue and groove profile, with removable top strip exposing sealant trough, knockout holes spaced at 6 inches, ribbed steel spikes with tongue to fit top screed edge.
- C. Sealant and Primer: Type as specified in Section 07 90 00.

2.5 CONCRETE MIX

- A. Select proportions for normal weight concrete in accordance with ACI 301 Method 1.
- B. Provide concrete of the following characteristics:
 - 1. Foundations: Compressive strength as indicated on structural drawings.
 - 2. Building slabs on grade: compressive strength as indicated on structural drawings.
 - 3. Remainder of concrete: compressive strength of 4,000 psi (stone) at 28 days.
- C. Measurements:
 - 1. Measure water by volume or weight.
 - 2. Measure all other materials by weight.
 - 3. One bag of cement is considered as one cubic foot or 94 lbs.
 - 4. One gallon of water as 8.33 lbs.
 - 5. Minimum 5 sack mix.
- D. Slump: Unless specifically specified, the slump at no time during batching, mixing, transporting or placing shall exceed that stated in the design mix.
 - 1. Slump: As indicated on drawings.
- E. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Architect, Structural Engineer and District of State Architects.
 - 1. Do not use calcium chloride nor admixtures containing calcium chloride.
 - 2. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing.
- F. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.
- D. Concrete shall not be placed until the forms and reinforcement have been inspected and approved by the Structural Engineer, the Inspector and Special Inspector.
- E. Concrete shall not be placed until all preparations for the pour have been completed, and the preparations have been checked by the Inspector subject to approval by the Structural Engineer.
- F. At the beginning of the work and from time to time as the work progresses, the Contractor shall verify and check dimensions on drawings with field conditions.
- G. The Contractor shall be responsible for the accuracy of the work, and bear all expense of any changes or extra work resulting from inaccuracies in the construction.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.
- B. In locations where new concrete is doweled to existing work, install dowels as detailed on the drawings.
- C. All masonry against which concrete is to be deposited shall be thoroughly wetted.
- D. Remove water from areas receiving concrete before concrete is placed.
- E. Forms shall be wetted or oiled prior to placing concrete. Remove any excess form oil.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Notify Testing Laboratory and Architect minimum 48 hours prior to commencement of operations.
- C. Concrete shall be placed only in the presence of the Inspector. The Inspector shall be notified at least 48 hours in advance of pours outside of regular working hours. Comply with CBC 1705A.3.5 & 1705A.3.6.
- D. Continuous batch plant inspection required, in accordance with California Building Code, Section 1705A.3.3. Section 01 40 00 – Quality Requirements: Field Inspecting, testing, adjusting and balancing.
- E. Ensure reinforcement, inserts, embedded parts, formed joints and vapor barriers are not disturbed during concrete placement.
- F. Install vapor barrier under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends.
- G. Exercise care in placing reinforcing steel, mesh and concrete, to avoid puncturing the sheeting.
- H. Do not drive stakes through barrier. Use flat base screed supports.
- I. Do not disturb or damage vapor barrier while placing concrete. Repair damaged vapor retarder. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.
- J. Tape tightly around all vertical sleeves that perforate barrier.
- K. Coordinate with work specified under other divisions or sections of the specifications, affording every reasonable facility for the introduction, storage and installation of all necessary materials and equipment into the work.
- L. Size and locations of boxing, sleeves, cans, recesses, chases, etc. shall be subject to approval of the Architect, and unless otherwise shown or specified shall clear all reinforcing by a minimum of 1 inch, and the size shall allow a minimum of 3 inches of concrete to opposite face of walls.
 - 1. Set and build-in materials which are required in concrete construction.
 - 2. Include all anchors, anchor slots, bolts, plates, brackets, etc. which are specified in other sections of the specifications but which are to be embedded in concrete.

3. Become familiar with and be responsible for work which is to be set and built-in under this section as well as that which will be set by other trades and built-in under this section.
 4. No pipes shall be embedded in structural concrete except where specifically detailed.
- M. Pipes other than conduits for electrical circuits shall not be embedded in structural concrete. Comply with ACI 318-19, Section 20.7 unless specified or detailed otherwise on structural drawings.
- N. Install sleeves and provide boxing or other devices necessary to form openings for the passage of pipes and conduits.
- O. Properly prepare reglets, rebates, recesses, platforms and bases as detailed or required for work or equipment.
- P. Deposit concrete at final position. Convey as rapidly as possible, by methods avoiding segregation or loss of ingredients and re-handling.
- Q. Keep concrete as level as possible, with a minimum flow from one portion of the work to another.
- R. Tamp and vibrate so as to produce a dense smooth job, free from rock pockets and voids.
- S. Use acceptable trunks and chutes to limit the free drop to not more than five feet.
- T. Do not use aluminum or aluminum lined pipe. Prevent concrete from contacting aluminum fittings.
- U. Under no circumstances shall concrete that has partially hardened be deposited in the work.
- V. Use only piston type pumps. Pumps shall be reversible.
- W. Compact each layer of concrete as placed with mechanical vibrators or equivalent equipment. Transmit vibration directly to concrete and in no case through forms or reinforcements. Accomplish thorough compaction. Supplement by rodding or spading by hand adjacent to forms. Compact concrete into corners and angles of forms and around reinforcement and embedded fixtures. Re-compact deep section with congestion due to reinforcing steel.
- X. Do not transport concrete in forms with vibrators nor allow vibrators to contact forms or reinforcing.
- Y. Excessive honeycomb or embedded debris in concrete is not acceptable.
- Z. Separate exterior slabs on fill from vertical surfaces with joint filler. Extend joint filler from bottom of slab to within 1/4 inch of finished slab surface. Conform to Section 07 90 00 for finish joint sealer requirements.

3.4 CONSTRUCTION JOINTS

- A. Place concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur.
- B. Clean and roughen construction joints in accordance with ACI 318-19, Section 26.5.6.

- C. Place floor slabs on fill in checkerboard pattern.
- D. Saw cut control joints at an optimum time after finishing. Use 3/16 inch thick blade, cutting 1/3 into depth of slab thickness.
- E. Provide off-set keyways or prefabricated metal construction joints in floor slabs where shown.
- F. Wherever possible, the concrete in any one unit of the construction shall be placed in one continuous operation with vertical and horizontal construction joints in approved locations. Before starting work in any unit of construction, the Contractor shall submit to the Architect and obtain approval of locations or proposed construction joints.
- G. Chip or roughen entire contact surface of hardened concrete by sandblasting to expose aggregate. Thoroughly clean concrete, reinforcing steel, forms and screed reglets of all mortar drippings, sand, loose aggregate, excess water, and other extraneous matter before placing next layer of concrete. Saturate all cold joints with water 24 hours in advance of placing fresh concrete. Maintain hardened concrete in a moist condition until fresh concrete is placed. Comply with ACI 318-19, Section 26.5.3.
- H. In case the above cleaning was not done or failed to produce approved results, the entire contact surface shall be thoroughly cleaned by chipping or sandblasting not earlier than five (5) days after the concrete was placed.
- I. Typical details and proposed locations of construction joints shall be as indicated on plans. Joints not indicated on plans shall be so made and located to least impair the strength of the structure and shall conform to typical details. Joint locations shall be approved by Structural Engineer of Record prior to construction.
- J. Vertical construction joints shall be cleaned immediately after removal of the end forms and shall be well soaked with water on the day preceding the next pour. Immediately before pouring against a vertical construction joint it shall again be wet down and slushed with a coat of neat cement grout.
- K. In the event that contact surfaces become coated with earth, sawdust or other debris after having been cleaned, they shall be re-cleaned by sandblasting if necessary before proceeding with the next concrete pour.

3.5 CONCRETE FINISHING

- A. Provide formed concrete surfaces to be left exposed with smooth rubbed finish.
- B. Uniformly spread, screed and float concrete for floor slabs. Do not spread concrete by vibration.
- C. Finish concrete floor surfaces in accordance with ACI 301.
- D. Wood float surfaces receiving quarry tile or ceramic tile with full bed setting system.
- E. Steel trowel surfaces receiving carpeting, resilient flooring or seamless flooring.
- F. Steel trowel surfaces which are indicated to be exposed.
- G. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/4 inch per foot nominal.

3.6 CURING AND PROTECTION

- A. Protect finished work under provisions of Section 01 70 00.
- B. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
 - 1. Protect concrete footings from freezing for minimum 5 days.
- C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- D. Concrete placing operations and freshly poured work shall be protected from rain with canvas or other approved covering until set, giving special attention to protection of floor slabs during this period.
- E. Cure concrete in accordance with ACI 308-19, Section 26.5.3.
- F. Apply curing compound on finished slab surfaces in accordance with manufacturer's instructions.
- G. Vertical Surfaces: Thoroughly wet forms containing concrete, including the tops and exposed portion of concrete, and maintain in a thoroughly moist condition until the forms are removed, but no less than 7 consecutive days from time of placing concrete.
- H. Continuously wet concrete between the hours of 8:00 a.m. and sunset each day, including Saturday, Sunday, and Holidays, for the first 4 days, and not less than 3 times daily for the 3 remaining days until the concrete reaches design strength.
- I. Foundations: Keep forms wet prior to stripping.
- J. Floor Slabs: The exposed surfaces of slabs shall be protected by an effective covering for a period of at least 7 days or as required by sealer manufacturer.
- K. Miscellaneous Curing: Thoroughly cure all work involving portland cement such as dry pack, patching, hole filling and mortar application. Water cure such work for at least 3 days.

3.7 INTERIOR CONCRETE SLAB CURING AND PROTECTION

- A. After pouring, placing, bullfloating, final finishing, soft cutting, and the surface of the concrete has hardened sufficiently to sustain foot traffic, sealer shall be applied.
- B. Apply sealer at the rate of 200 square feet per gallon coverage. If puddling or bird bathing occurs lightly, broom product evenly over the substrate.
- C. Continue brooming the product evenly over the substrate until the product has penetrated into the concrete.

3.8 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Testing Laboratory Services: Field inspecting, testing, adjusting, and balancing.
- B. Field inspection and testing will be performed under provisions of Section 01 41 00.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken. Comply with CBC 1705A.3.6.

- D. See approved DSA form 103 for required special inspections and tests.

3.9 PATCHING

- A. Allow Architect to review concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect upon discovery.
- C. Patch imperfections in accordance with ACI 301.

3.10 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements and/or specified strength.
- B. Repair or replacement of defective concrete will be determined by Architect.
- C. Modify or replace concrete not conforming to required levels and lines, details, and elevations.
- D. Repair or replace concrete not properly placed or of the specified type.
- E. Whenever the 28-day tests fail to develop the required strength, the Testing Laboratory shall adjust the mix by increasing the amount of cement or decreasing the amount of water sufficiently so that the resulting concrete shall attain the specific requirements.
- F. Defective concrete in place must be tested by the core method and show a compressive strength at least equal to the design strength.
- G. When required by the Architect, tests of hardened concrete shall be made in accordance with "Standard Method of Securing Specimens of Hardened Concrete from the Structure", ASTM C-42.
- H. Test specimens shall be secured and tested by the Testing Laboratory under the direction of the Architect.
- I. The Contractor shall pay all expense of such tests.
- J. If the compressive tests of the core specimens fail to show the compressive strength assumed in the design, the concrete will be deemed defective and shall be removed and replaced or adequately strengthened in a manner acceptable to the Architect, Structural Engineer and the Division of the State Architect.

3.11 SLAB TOLERANCES

- A. Maintain surface flatness with maximum variation of 1/8 inch in 10 feet.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members and support members.
- B. Baseplates and anchor bolts.
- C. Grouting under baseplates.

1.2 REFERENCES

- A. 2022 California Building Code, Chapter 22A.
- B. ASTM A36 - Structural Steel.
- C. ASTM A53 - Hot-Dipped, Zinc-Coated Welded and Seamless Steel Pipe.
- D. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.
- E. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.
- F. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- G. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- H. ASTM A572 - High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
- I. ASTM A992 - Structural Steel Shapes.
- J. AWS A2.0 - Standard Welding Symbols.
- K. AWS D1.1 - Structural Welding Code.
- L. AWS D1.3 - Structural Welding Code – Sheet Steel (Cold Formed Metal Framing)
- M. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
- N. AISC - Specification for Architectural Exposed Structural Steel.
- O. SSPC - Steel Structures Painting Council.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, and locations of structural members, connections, cambers and loads.

- 2. Indicate welded connections with AWS A2.0 welding symbols. Indicate net weld lengths.
- C. Manufacturer's Mill Certificate: Submit under provisions of Section 01 33 00 certifying that products meet or exceed specified requirements.
- D. Mill Test Reports: Submit under provisions of Section 01 33 00 Manufacturer's Certificates, indicating structural strength and destructive and non-destructive text analysis.
- E. Welders' Certificates: Submit under provisions of Section 01 33 00 Manufacturer's Certificates, certifying welders employed on the work, verifying AWS qualifications within the previous 12 months. Provide copy of certificate for each welder.

1.4 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.
- B. Perform work in accordance with AISC - Specification for Architectural Exposed Structural Steel.

1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on Drawings.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Structural Steel Members: W shapes shall conform to ASTM A992 Grade 50. S, M and HP shapes shall conform to ASTM A572. All angles and plates shall conform to ASTM A36.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Pipe: ASTM A53, Grade B.
- D. Bolts, Nuts, and Washers: ASTM A307.
- E. Welding Materials: AWS D1.1; type required for materials being welded.
- F. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 8,000 psi at 28 days.
- G. Shop and Touch-Up Primer: SSPC Paint 2, red iron oxide, oil-alkyd.

2.2 FABRICATION

- A. Fabricate structural steel members in accordance with AISC Specification.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. All materials shall be free from scale and rust and in new condition when fabricated.
- D. Bolt holes shall be punched with a diameter 1/16" greater than the corresponding bolt diameter.

- E. All anchor, sill and stud bolts shall be fabricated with cut threads. No upset (rolled) threaded bolts are permitted.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP-2.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded or in contact with concrete.

2.4 SOURCE QUALITY CONTROL AND TESTS

- A. Testing and analysis of components will be performed under provisions of Section 01 41 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.2 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- B. Field weld components and shear studs indicated on Drawings.
- C. Do not field cut or alter structural members without approval of Architect and Structural Engineer.
- D. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- E. Surfaces in contact with non-compatible metals shall be separated therefrom with chrome-lock impregnated felt tape 1/16" thick, No. 165.
- F. Grout with non-shrink grout under baseplates.
- G. No welded splices shall be made except those shown on the approved plans.

3.3 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01 41 00.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated ferrous metal items, galvanized and prime painted.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A36 - Structural Steel.
 - 2. ASTM A123 - Zinc (Hot-Galvanized) Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.
 - 3. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 4. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.
 - 5. ASTM A325 - High Strength Bolts for Structural Steel Joints.
 - 6. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 7. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- B. American Welding Society:
 - 1. AWS A2.0 - Standard Welding Symbols.
 - 2. AWS D1.1 - Structural Welding Code.
- C. Steel Structures Painting Council.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations and details where applicable.
- C. Indicate welded connections using standard A2.0 welding symbols. Indicate net weld lengths.

1.4 QUALIFICATIONS

- A. Welders' Certificates: Submit under provisions of Section 01 33 00, certifying welders employed on the work, verifying AWS qualifications within the previous 12 months.

1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on Drawings.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Structural Steel Shapes: ASTM A992; W and WT Shapes.

- B. Other Steel Sections: ASTM A36.
- C. Steel Tubing: ASTM A500, Grade B.
- D. Pipe: ASTM A53, Grade B.
- E. Bolts, Nuts, and Washers: ASTM A307 galvanized to ASTM A153 for galvanized components.
- F. High Strength Bolts: ASTM A325.
- G. Welding Materials: AWS D1.1; type required for materials being welded.
- H. Shop and Touch-Up Primer: Fabricator's standard, fast-curing, lead-free, "universal" primer; selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements of FS TT-P-645.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC 20.

2.2 FABRICATION, GENERAL

- A. Fit and shop assemble in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds unless indicated otherwise.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FINISHES

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with one coat.
- D. Galvanize items to minimum 1.25 oz/sq.ft. zinc coating in accordance with ASTM A123.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated on Drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain Architect approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Repair galvanized surfaces after welding with zinc rich paint, conforming to ASTM A-780.

3.4 SCHEDULE

- A. The Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.
- B. Miscellaneous Framing and Supports: Steel not a part of structural steel framework as required to complete work.
- C. Bumper Posts: As detailed; prime paint finish.
- D. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- E. Ledge and Shelf Angles, Channels and Plates Not Attached to Structural Framing: For support of metal decking joists masonry prime paint finish.
- F. Lintels: As detailed; prime paint finish.
- G. Door Frames for Overhead Door Openings and Wall Openings: Structural sections; prime paint finish.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural floor, wall and roof framing.
- B. Built-up structural beams.
- C. Wall and roof sheathing.
- D. Wood furring, backing and grounds.
- E. Preservative treatment of wood.

1.2 REFERENCES

- A. 2022 California Building Code, Chapter 23.
- B. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.
- C. APA-The Engineered Wood Association.
- D. AWPA - American Wood Protection Association: Book of Standards.
- E. NFPA - National Forest Products Association.
- F. WCLIB - West Coast Lumber Inspection Bureau: Standard Grading Rules for West Coast Lumber.
- G. WWPA - Western Wood Products Association.
- H. AWC - NDS 2018 - National Design Specifications for Wood Construction by American Wood Council.

1.3 QUALITY ASSURANCE

- A. Lumber Grading Agency: Certified by ALSC.
- B. Plywood Grading Agency: Certified by APA.

1.4 REGULATORY REQUIREMENTS

- A. Conform to 2022 California Fire Code and 2022 California Building Code.

1.5 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Provide technical data on wood preservative materials and application instructions.

- C. In lieu of grade stamping exposed-to-view lumber and plywood, submit manufacturer's certificate under provisions of Section 01 33 00 that products meet or exceed specified requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Store and protect products under provisions of Section 01 33 00.

1.7 FIELD QUALITY CONTROL

- A. Inspection of lumber and plywood grading, and inspection of the timber connectors shall be performed under provisions of Section 01 41 00 and as required by the Division of the State Architect and District Inspector.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

- A. Lumber Grading Rules: NFPA, WCLIB and WWPA.
- B. Beam Framing: Douglas Fir-Larch species, No. 1 Grade.
- C. Joist Framing: Douglas Fir-Larch species, No. 1 Grade.
- D. Studs, Plate, Blocking and Non-Structural Light Framing: Douglas Fir-Larch species, No. 1 Grade, unless noted otherwise.
- E. All lumber 3x and larger shall be free of heart center.
- F. The face of all lumber and plywood shall be grade stamped.

2.2 LVL MATERIALS

- A. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. RedBuilt
 - b. Boise Cascade Corporation.
 - c. Weyerhaeuser Company
- B. See Structural Drawings for additional information.

2.3 PLYWOOD MATERIALS

- A. Wall Sheathing: APA Douglas Fir Structural I, Grade C-D; sanded.
- B. Floor & Roof Sheathing: APA Douglas Fir Structural I, Grade C-D; sanded.
- C. Underlayment: APA Douglas Fir Structural I, Grade C-D; sanded.

2.4 ACCESSORIES

- A. Fasteners: Hot-dipped galvanized steel for exterior, high humidity, and treated wood locations; plain finish elsewhere; size and type to suit condition.
- B. Connectors: As indicated.
- C. Joist Hangers: Galvanized steel, sized to suit joists and framing conditions; manufactured by "Simpson" OR "USP".
- D. Anchors: Through bolt or anchor bolt to concrete or masonry unless otherwise noted. Bolt for anchorage to steel unless otherwise noted.
- E. Building Paper: No. 15 asphalt felt. Plain untreated cellulosic building paper.

2.5 WOOD TREATMENT

- A. Preservative Treatment: Where lumber or plywood is indicated as treated or is specified herein to be treated, comply with applicable requirements of AWPAs Standard U1. Each treated item shall bear the quality mark of an ALSC accredited agency and comply with code Section 2320A.6, 2022 California Building Code.
- B. Pressure treat above ground items with water-borne preservatives to comply with AWPAs Use Category 3B (UC3B) or Use Category 4A (UC4A) as described in Section 2 of AWPAs Standard U1. After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 percent. Treat indicated items and the following:
 - 1. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with concrete.
 - 2. Wood framing members less than 6" above grade.
 - 3. Wood floor plates installed over concrete slabs and curbs directly in contact with earth.
- C. Complete fabrication of treated items prior to treatment, where possible. If cut or drilled after treatment, coat cut or drilled surfaces as prescribed in AWPAs M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.
 - 1. Interior Type A: Use where treated wood is indicated for interior applications.
 - 2. Exterior Type: Use where "FRTW" wood is indicated for exterior, exposed applications.
 - 3. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.
- D. Every piece of treated lumber 3'-0" or longer shall bear the stamp or an end tag. Certificates are not acceptable.
- E. Local fire authority to be notified prior to delivering combustibles to the site and verify with local fire authority for fire protection during construction.

PART 3 EXECUTION

3.1 FRAMING

- A. Erect wood framing members level and plumb.
- B. Place horizontal members laid flat, crown side-up.
- C. Construct framing members full length without splices.

- D. Double members at openings over one sq. ft. Space short studs over and under opening to stud spacing.
- E. Construct double joist headers at floor and ceiling openings. Frame rigidly into joists.
- F. Construct double joists under wall studding.
- G. Bridge joists in excess of 8 feet span at mid-span members with solid blocking. Fit solid blocking at ends of members.
- H. Coordinate installation of glue laminated structural units.
- I. No cutting or notching is allowed except at members that are fully detailed on plans.
- J. Pipe in wall notches shall not be placed in studs.
- K. Holes not exceeding one third of the width of stud may be bored neatly and located in the center of the center third of the member being penetrated.

3.2 FURRING, BLOCKING AND GROUNDS

- A. Provide wherever shown and where required for attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to form work before concrete placement.
- C. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished work.
- D. Provide continuous 2x blocking at 8'-0" intervals vertical to provide fire blocking and as shown on plans.
- E. Provide continuous 2x blocking at line of all ceilings.
- F. Provide continuous 2x blocking at all cabinetry and surface mounted furnishings.
- G. Provide 2x blocking continuous at all other locations not specifically mentioned, such as holes for pipes, shafting, behind furring strips and similar places that could afford a passage for flames.

3.3 SHEATHING

- A. Secure roof sheathing perpendicular to framing members with ends staggered. Secure sheet edges over firm bearing. Provide solid edge blocking between sheets.
- B. Secure wall sheathing perpendicular to wall studs, with ends staggered, over firm bearing.
- C. Secure sub-floor perpendicular to floor framing with end joints staggered. Secure sheet edges over firm bearing. Attach sheathing with sub-floor glue and drywall screws.
- D. Place building paper between underlayment and sub-flooring.

- E. Secure flooring underlayment after dust and dirt generating activities have ceased and prior to application of finished flooring. Apply perpendicular to sub-flooring. Stagger end joints of underlayment.

3.4 TOLERANCES

- A. Framing Members: 1/4 inch maximum from true position. Excludes gapping.
- B. Surface Flatness of Floor: 1/4 inch in 10 feet maximum.

END OF SECTION

SECTION 06 17 33

WOOD I-JOISTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wood I Joists.
- B. Bridging, bracing and anchorage.
- C. Framing for openings.

1.2 REFERENCES

- A. APA - American Plywood Association.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacture of prefabricated wood joists with three years minimum experience.
- B. Design joists under direct supervision of a Civil or Structural Engineer experienced in structural framing design registered in the State of California. Where joists support mechanical equipment, include weight in joist design.
- C. Products shall be proven by testing and evaluation in accordance with the provisions of ASTM D5055.

1.4 REGULATORY REQUIREMENTS

- A. Conform to 2022 CBC for loads, seismic zoning, and other load governing criteria.

1.5 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Indicate framing system, sizes and spacing of joists, loads and joist cambers, bearing and anchor details, bridging and bracing, and framed openings.
 - 1. Allowable moment shall be calculated based upon the moment factor given in ICC ESR-2994.
 - 2. The reference design moment values listed in ICC ESR-2994 may not be increased by any code allowed repetitive-member use factor.
 - 3. Bridging or blocking shall be installed per ICC ESR-2994.
 - 4. Complete blocking details must be provided, particularly for lateral shear transfer blocking.
 - 5. Complete web stiffener details as shown in ICC ESR-2994 shall be provided.
 - 6. Minor loads (point loads < 20lbs.) hung from joists need not be detailed on plans except for suspended ceiling systems (see DSA IR 25-2). For heavier loads, a detail must be shown on the plans (see attached sheets).
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Transport and store joists in vertical position resting on bearing ends.
- B. Protect joists from moisture, warping and distortion during transit and when site stored.

1.7 QUALITY CONTROL

- A. Inspection of joist fabrication shall be performed under provisions of Section 01 41 00 and as required by the Division of the State Architect and District Inspector.
- B. Each of the joists shall be identified by a stamp indicating the joist series, ICC-ES report number, manufacturer's name, plant number, date of fabrication, and the independent inspection agency's logo.
- C. The OSB web material conforming to DOC Voluntary Product Standard PS2, Exposure 1, along with further requirements set forth in the quality documentation that contains RedBuilt manufacturing standards.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. RedBuilt, (909) 465-6457. Red-I Joists. (Basis of Design)
- B. Substitutions: Under provisions of Section 01 60 00.

2.2 MATERIALS

- A. Roof Joists: Sizes, dimensions, and lengths indicated on the drawings.
- B. Joist Bridging: Type, size and spacing as shown on plans.
- C. Roof Blocking: Same material and depth as joists.

2.3 ACCESSORIES

- A. Provide all web stiffeners, blocking panels, connections, etc., as required for a complete installation.
- B. Fasteners: Galvanized steel, type to suit application, as indicated on drawings.
- C. Joist hangers and hardware shall be as shown on drawings.

2.4 FABRICATION

- A. Verify dimensions and site conditions prior to fabrication.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that supports and openings are ready to receive joists.
- B. Verify sufficient end bearing area.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Coordinate placement of bearing items.

3.3 INSTALLATION

- A. Install joists in accordance with manufacturer's instructions.
- B. Place joists true to line and level.
- C. Provide temporary bracing to position joists in place until permanently secured.
- D. Place permanent bridging, bracing, and anchors to maintain joists straight and in correct position before installation of decking or inducing loads.
- E. Do not field cut joists.
- F. Place headers and supports to frame openings required.
- G. Frame openings between joists with lumber in accordance with Section 06 10 00, unless indicated otherwise on drawings.
- H. Coordinate placement of decking with work of this Section.

3.4 TOLERANCES

- A. Framing Members: 1/2 inch maximum from true position.
- B. Depth: +/- 1/16"
- C. Flange Width: +/- 1/16"

END OF SECTION

SECTION 06 20 00
FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items, other than shop prefabricated casework.
- B. Hardware and attachment accessories.
- C. Refer to schedule at end of this Section.

1.2 REFERENCES

- A. Woodwork Institute - Manual of Millwork.

1.3 QUALITY ASSURANCE

- A. Manufacture millwork and finish carpentry items in accordance with the standards of the latest edition of "Manual of Millwork" published by the Woodwork Institute.
- B. Issue W.I. Certified Compliance Certificate to Architect prior to delivery of millwork.

1.4 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Indicate materials, component profiles, fastening methods, jointing details, finishes, and accessories to a minimum scale of 1-1/2 inch to one foot. Provide W.I. Certified Compliance label on first page of each set.
- C. Submit samples under provisions of Section 01 33 00.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and protect products under provisions of Section 01 50 00.
- B. Store materials in ventilated, interior locations under constant minimum temperatures of 70 degrees F and maximum relative humidity of 50 to 55 percent.

PART 2 PRODUCTS

2.1 FABRICATORS

- A. Any W.I. certified fabricator meeting the requirements of this Section.

2.2 MATERIALS

- A. Materials specified under Millwork Manual Section Numbers refer to lumber grades in "Manual of Millwork" as follows: Section 3, Lumber Grades – Hardwood/Softwood; Section 4, Plywood Grades – Hardwood/Softwood.

2.3 EXTERIOR TRIM, FRAMES & MILLWORK

- A. Fabricate in accordance with Section 6 of Millwork Manual:

<u>Item</u>	<u>W.I. Species</u>	<u>W.I. Grade</u>	<u>Intended Finish</u>
Exterior wood trim fascias & rakes	Redwood	Custom	Opaque

2.4 INTERIOR TRIM, JAMBS & MILLWORK

- A. Fabricate in accordance with Section 9 of Millwork Manual:

<u>Item</u>	<u>W.I. Species</u>	<u>W.I. Grade</u>	<u>Intended Finish</u>
Base, Casing & Trim	Red Oak	Custom	Transparent
Seats & Benches	V.G. Douglas Fir	Custom	Opaque
Handrails	Red Oak	Custom	Transparent

2.5 PLASTIC LAMINATE MATERIALS

- A. Plastic Laminate: 0.028 inch Vertical color, and pattern, by Architect, surface finish, from manufactures full range of colors and textures; manufactured by Wilsonart, Formica, or equal.
- B. Plastic Laminate Backing: High pressure paper base laminate without a decorative finish; 0.020 inch thick.

2.6 ADHESIVE

- A. Contact Adhesives: W.I. 426.
- B. Wall Adhesive: Solvent release, cartridge type, compatible with wall substrate, capable of achieving durable bond.

2.7 ACCESSORIES

- A. Nails: Size and type to suit application, galvanized finish.
- B. Bolts, Nuts, Washers, Blind Fasteners, Lags, and Screws: Size and type to suit application, galvanized finish.
- C. Lumber for Shimming and Blocking: Softwood lumber of Douglas Fir species.
- D. Primer: Alkyd primer sealer.
- E. Wood Filler: Solvent base, tinted to match surface finish color.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and openings are ready to receive work and field measurements are as instructed by the fabricator.
- B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.3 INSTALLATION

- A. Install work in accordance with W.I. Manual of Millwork, Custom quality standard.
- B. Apply plastic laminate finishes where indicated. Adhere with adhesive over entire surface. Make joints and corners hairline. Match patterns. Cap exposed edges with 3/8 inch thick hardwood trim. Apply laminate backing sheet on reverse side of plastic laminate finished surfaces.

3.4 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.5 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Site Finishing: Refer to Section 09 90 00 for painted and stained finishes.

3.6 PROTECTION

- A. Protect finished installation under provisions of Section 01 50 00.

END OF SECTION

SECTION 06 41 16

PLASTIC-LAMINATED-CLAD ARCHITECTURAL CABINETS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Special fabricated cabinet units.
- B. Countertops.
- C. Prepared for utilities.
- D. Cabinet hardware.

1.2 REFERENCES

- A. Woodwork Institute - North American Architectural Woodwork Standards (NAAWS), latest edition.
- B. Conform to 2022 California Building Code

1.3 QUALITY ASSURANCE

- A. Manufacture casework items in accordance with Custom Grade North American Architectural Woodwork Standards (NAAWS) published by Woodwork Institute.
- B. Issue a W.I. Certified Compliance Certificate to Architect prior to delivery of millwork.
- C. 2022 California Building Code, Chapter 11B, Chapter 16A and Chapter 23A.
- D. Trade Contractor will allow in his bid for the replacement of two cabinets, which will be selected at random by the District for dismantling and inspection of internal construction & compliance with this Specification and requirements of “formaldehyde free” construction. Trade Contractor to provide labor and tools for inspection under the Architect's direction and supervision.

1.4 MOCKUP

- A. Prepare mockup under provisions of Section 01 40 00.
- B. Provide full size base cabinet and upper cabinet of each type indicated in specified finish with hardware installed.
- C. Units will be examined to ascertain quality and conformity to NAAWS standards.
- D. Units will establish a minimum standard of quality for this work.
- E. Approved units may be used as part of the work.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.

- B. Include materials, component profiles, fastening methods, assembly methods, joint details, accessory listings, and schedule of finishes. Provide W.I. Certified Compliance label on first page of each set.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit three samples 6" x 6" inch in size illustrating laminate textures and colors. Selection by the Architect will be made from manufactures full range of colors and textures.
- E. Submit literature and data sheets as necessary to establish "formaldehyde free" nature of the proposed materials. "Formaldehyde Emission Barriers for Particleboard and Medium Density Fiberboard" are NOT acceptable in lieu of "formaldehyde free" materials.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Any W.I. Accredited Millwork Company meeting the requirements of this Section.

2.2 MODULAR CASEWORK - LAMINATED PLASTIC COVERED

- A. Fabricate in accordance with NAAWS Section 10:
 - 1. NAAWS Grade: Custom
 - 2. Core: MDF Grade 130
 - 3. Construction: Flush Overlay.
 - 4. Edge Bands: .5mm PVC, the same as exposed faces.
 - 5. Exposed Exterior Surfaces: .028" high pressure plastic laminate Grade VSG, color and pattern from full range of patterns, satin finish or solid colors as selected by Architect.
 - 6. Semi-Exposed Surfaces: Low pressure decorative polyester or melamine laminate ALA-85.
 - 7. Exposed Interior Surfaces: 0.028" high pressure plastic laminate Grade VGS, same color, pattern and finish as exposed exterior surfaces.

2.3 LAMINATED PLASTIC COUNTERTOPS

- A. Fabricate in accordance with NAAWS Section 11:
 - 1. NAAWS Grade: Custom
 - 2. Core: MDF Grade 130
 - 3. Edge Detail: Rolled No-drip bull nose at wet areas & regular bull nose @ non-wet areas.
 - 4. Back Splash: Integral Cover.
 - 5. Top of Back Splash: Waterfall.
 - 6. Plastic Colors and Pattern: To be selected from full range of patterns, satin finish or solid colors as selected by Architect.

2.4 HARDWARE

- A. Finish: Satin Aluminum.
- B. Shelf Standards and Rests: Hettich Recessed.
- C. Drawer and Door Pulls: EPCO MC-400-5S (2 13/16" projection). Provide U shaped wire pulls at all accessible casework or equally accessible pull hardware.
- D. Door Locks: National No. C8173.
- E. Drawer Locks: Corbin 0738.
- F. Cabinet Locks: Corbin 0737.
- G. Sliding Glass Door Locks: EPCO NO. G-03.
- H. Catches: EPCO 591 at casework doors. Provide two EPCO 592 on doors over 36" in height.
- I. Drawer Slides: Accuride 3837 & 4437.
- J. Hinges: Heavy duty wrap-around, 2-1/2" minimum width, offset for overlay doors, RPC 374 or equal.
- K. Sliding Door Track Assemblies: Grant/ Hettich No. 6005 with No. 6320 and No. 6330 hangers.
- L. Sliding Door Stops: Grant/ Hettich No. 1018.
- M. Sliding Door Pins: Ammerock No. 36686.
- N. Sliding Glass Door Tracks: Knapp and Vogt No. 1092 set.

2.5 DOOR AND DRAWER LOCK SCHEDULE/MISCELLANEOUS ADDITIONS

- A. Provide door and drawer locks on all casework.
- B. R-1 keyway (5 or 6 pin) to District Master Key standard as manufactured by: Olympus Lock – 500DR (door), 600DW (drawer), 400SD (sliding door) or Corbin Lock – 0737 (door), 0738 (drawer), 02291 (sliding door).
- C. All cabinet door, drawer, and sliding door locks shall be easily re-keyable with a set screw or button cylinder release system so as to afford easy access to the cylinder and cylinder housing by District facility personnel in servicing locks. Cylinders to have forwardly removable cylinder slide for easy access to lock pins. Locks to have passed ANSI Grade 1 testing. Any cam locks must be to the same District R-1 Master Key system. See District Locksmith for keying direction.

2.6 FABRICATION

- A. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- B. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surfaces of cut edges.

- C. All adjustable shelves shall be 1" thick, material and surface as required to meet NAAWS requirements for 40 lb/sq ft loading
- D. Operable parts for all accessible casework shall comply with CBC Section 11B-309.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify adequacy of backing and support framing.

3.2 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered to the site in undamaged condition, stored in fully covered, well ventilated areas, and protected from extreme changes in temperature and humidity, as recommended by NAAWS Section 2.
- B. In the event of damage, immediately make necessary repairs or replacements.

3.3 INSTALLATION

- A. Set and secure casework in place rigid, plumb and level.
- B. Install work in this section as specified in the NAAWS, and provide a W.I. Certified Compliance Certificate for installation at the completion of project installation.

3.4 ADJUSTING AND CLEANING

- A. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.
- B. Clean casework, counters, shelves, hardware, fittings and fixtures.

3.5 CLOSE OUT

- A. Upon completion of work of this section, Contractor shall remove all equipment, excess material and waste products from site.
- B. Provide two keys for each cabinet lock. Cabinets in each particular room shall be keyed alike; cabinets in different room shall be keyed differently.

3.6 GUARANTY

- A. Upon completion of work of this section, Contractor shall provide one year guaranty in accordance with Section 01 70 00.

END OF SECTION

SECTION 07 14 00

FLUID APPLIED WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water repellent coating to exterior and interior masonry, concrete, and cement plaster surfaces.

1.2 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacture of water repellent coatings with five years minimum experience.
- B. Applicator: Acceptable to manufacturer.

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Include details of product description, tests performed, limitations to coating, cautionary procedures required during application, and chemical properties, including percentage of solids.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.4 FIELD SAMPLE

- A. Apply coating to 24 sq. foot area of each surface to be waterproofed where directed by Architect.
- B. Apply number of coats specified. Color change or surface sheen is cause for rejection of product.

1.5 WARRANTY

- A. Provide five (5) year warranty for materials and installation.
- B. Warranty: Maintain treated surface free from penetration of moisture. Repair damage to interior surface of walls that moisture has penetrated.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply coating when ambient temperature is lower than 50 degrees F or higher than 100 degrees F.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Ven-Chem Co., Inc. (818) 342-1195.
- B. Substitutions: Under provisions of Section 01 33 00.

2.2 MATERIALS

- A. Coating for vertical concrete or unpainted cement plaster: Deep Seal-Crystal Clear.
- B. Coating for concrete unit masonry: Super-Kote Clear Heavy.
- C. Coatings: Clear, non-yellowing formulations containing no silicones.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify joint sealants are installed and cured.
- B. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of coating.
- C. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

- A. Remove loose particles and foreign matter.
- B. Remove oil or foreign substance with a chemical solvent which will not affect coating.
- C. Protect adjacent surfaces not scheduled to receive coating.
- D. If applied on unscheduled surfaces, remove immediately by approved method.

3.3 APPLICATION

- A. Delay work until substrate is cured a minimum of 30 days.
- B. Apply coating in accordance with manufacturer's instructions, using airless spray.
- C. Apply Deep Seal to concrete and plaster in one continuous, uniform coat at a rate of 150 square feet per gallon.
- D. Apply Super-Kote to concrete masonry units in two continuous, uniform coats, allowing minimum 12 hours drying time between coats.
 - 1. First Coat : 100 square feet per gallon.
 - 2. Second Coat: 130 square feet per gallon.

3.4 FIELD QUALITY CONTROL

- A. Drums containing water-repellent material shall not be removed from the job site until completion of all water-repellent treatment and until so authorized in writing by the Contracting Officer.

3.5 FIELD TESTING

- A. At time not less than twenty days after completion of the water-repellent application, subject a representative wall area of at least 100 square feet of each building to a simulated rainfall for a period of three hours. Location of wall area will be determined by the Architect. Use a minimum 5/8" diameter hose and a lawn sprinkler which will direct the full flow of water against the wall.

Place the sprinkler so that the water will strike the wall downward at a 45 degree angle to the wall for a period of three hours. If the inside of the wall shows any trace of moisture during or following the test, apply another coat to the entire building. The testing and recoating process shall be repeated until no moisture shows on inside wall face.

3.6 SCHEDULE

- A. Provide at all exterior vertical masonry/concrete surfaces.
- B. Provide at all exterior vertical plaster/stucco surfaces.
- C. Provide at other areas as indicated on Drawings.

END OF SECTION

SECTION 07 21 16
BLANKET INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Batt insulation and vapor barrier in exterior wall or furring and ceiling roof construction.
- B. Batt insulation for filling perimeter window and door shim spaces crevices in exterior wall and roof.
- C. Batt sound insulation in interior walls and partitions and above ceiling.

1.2 REFERENCES

- A. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

1.3 PERFORMANCE REQUIREMENTS

- A. Materials of this Section shall provide continuity of thermal barrier at building enclosure elements.
- B. Materials of this Section shall provide continuity of sound control where indicated or scheduled.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Manville Corporation.
 - 2. Lamtec Corporation.
 - 3. Owens-Corning Fiberglass Corporation.
 - 4. CertainTeed Corporation.
 - 5. United States Gypsum Insulation Products.
 - 6. Substitutions: Under provisions of Section 01 60 00.

2.2 MATERIALS

- A. Batt Thermal Insulation at Roof of Platform Room E114 and Gymnasium Room F109: ASTM C665 preformed glass fiber batt, Type II, Class B, with ASTM C1136 black coating one side, equal to WMP-10 Black as manufactured by Lamtec Corporation.
 - 1. Flame Spread Rating: 25 or less.
 - 2. Maximum smoke density of 450, when tested in accordance with the 2022 California Building Code, Section 803.1.2, Class A.
 - 3. Roof: R-38 or better, black faced thermal insulation.
- B. Batt Thermal Insulation: ASTM C665 preformed glass fiber batt, Type III, Class B, with reflective covering one side.
 - 1. Flame Spread Rating: 25 or less.
 - 2. Maximum smoke density of 450, when tested in accordance with the 2022 California Building Code, Section 803.1.2, Class A.

3. Exterior stud walls or furring: 2x6 - R-21 or better; 2x4 - R-15 or better.
 4. Roof: R-38 or better.
- C. Batt Sound Insulation: ASTM C665 preformed glass fiber batt, Type I unfaced, with flame spread of 25 or less.
1. Flame Spread Rating: 25 or less.
 2. Maximum smoke density of 450, when tested in accordance with the 2022 California Building Code, Section 803.1.2, Class A.
 3. Provide R-11 sound insulation in all interior partition walls from floor level to 6 inches above ceiling line and above all interior ceilings.
- D. Nails or Staples: Steel wire; electroplated; type and size to suite application.
- E. Tape: Bright aluminum self-adhering type, mesh reinforced, 2" wide.
- F. Sag Wires: Provide 18 gage galvanized wire.
- G. Impaling and stick-pins, including washers are to be provided as recommended in writing by insulation manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

- A. Install insulation in accordance with insulation manufacturer's instructions.
- B. Install in all exterior stud walls and ceiling spaces without gaps or voids.
- C. Install sound insulation between studs in all stud walls surrounding restrooms from floor to roof deck partition wall, ceiling and also in areas where shown on the drawings.
- D. Install sound insulation over ceilings of all restrooms and also in areas where shown on the drawings.
- E. Trim insulation neatly to fit spaces.
- F. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
- G. Install with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane between framing members.
- H. Staple or nail in place at maximum 6" on center.
- I. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- J. Do not compress insulation in excess of 10%.
- K. Where downspouts from the roof drains come down inside the building, wrap downspouts from the roof to the floor with 2-1/2" sound insulation blankets. These batts shall be secured in place.

- L. Ensure secure attachment so that insulation will not sag over time. Friction fitting is not sufficient. Mechanically attach insulation. Double-sided tape attachment is not acceptable.
 - 1. Where insulated walls are being left unfinished, install sag wires to support insulation.
 - 2. Where insulation is being installed using impaling pins, ensure that washers are installed over pins after insulation is in place. Space pins as necessary to provide insulation installation will not sag over time, and as recommended in writing by insulation manufacturer.

3.3 CLEAN UP

- A. Remove all rubbish and surplus materials from the site and dispose of in a legal manner.

END OF SECTION

SECTION 07 22 20

ROOF BOARDS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Fiberglass-mat faced gypsum roof boards for application directly under roof membrane systems.

1.02 REFERENCES

- A. ASTM International (ASTM):
 1. ASTM C209 Standard Test Method for Cellulosic Fiber Insulating Board
 2. ASTM C472 Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete.
 3. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
 4. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 5. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 6. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
 7. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
 8. ASTM E108 Standard Test Methods for Fire Tests of Roof Coverings
 9. ASTM E136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 C.
 10. ASTM E661 Standard Test Method for Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads.
- B. Underwriters Laboratories (UL): UL 790 Standard Test Methods for Fire Tests of Roof Coverings.

1.03 SUBMITTALS

- A. Product Data and Installation Instructions: Submit manufacturer's product data including installation instructions and substrate preparation recommendations
- B. Sample warranty: Submit a sample warranty identifying the terms and conditions of the warranty as herein specified.

1.04 QUALITY ASSURANCE

- A. Inspection: Where applicable, allow for Owner's inspection and moisture testing and reporting prior to installation of roof boards.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. All components used in roofing systems, including DensDeck® Prime Roof Boards, shall be protected from exposure to moisture before, during and after installation.
- B. Remove any plastic packaging from roof boards immediately upon receipt of delivery. Failure to remove plastic packaging may result in entrapment of condensation or moisture, which may cause application problems that are not the responsibility of manufacturer.
- B. Any protective, plastic factory packaging that is used to wrap roof boards for shipment is intended to provide temporary protection from moisture exposure during transit only and is not intended to provide protection during storage after delivery.
- C. Roof boards stored outside shall be stored level and off the ground and protected by a waterproof covering. Provide means for air circulation around and under stored bundles of DensDeck® Prime Roof Boards. Use adequate supports to keep the bundles flat, level and dry.
- D. Care should also be taken during installation to avoid the accumulation of moisture in the system. Roof boards shall be covered the same day as installed. Avoid application of roof boards during rain, heavy fog and any other conditions that may deposit moisture on the surface, and avoid the overuse of non-vented, direct-fired heaters during winter months.

1.06 FIELD CONDITIONS

- A. Application standards where applicable are in accordance with design assembly specifics, system manufacturer requirements and the DensDeck® Technical Guide.
- B. Do not install DensDeck® Prime Roof Board that is moisture damaged. Indications that panels are moisture damaged include, but not limited to, discoloration, sagging, or irregular shape.
- C. Installed DensDeck® Prime Roof Boards shall be dry, with free moisture content of less than 1% using a moisture meter that has been set to the gypsum scale, before applying adhesive, asphalt or membrane.
- D. All components used in roofing systems, including DensDeck® Roof Boards, shall be protected from exposure to moisture before, during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS:

- A. Georgia-Pacific Gypsum LLC products as specified herein.
- B. Substitutions: Under provisions of Section 01 33 00.

2.02 COATED PRIME FIBERGLASS-MAT FACED GYPSUM ROOF BOARDS:

- A. Fiberglass Mat Faced Gypsum Roof Board:
1. Acceptable Product: GP Gypsum, DensDeck® Prime with EONIC™ Technology Roof Boards.
 2. Thickness: 1/4 inch.
 3. Width: 4 feet.
 4. Length: 8 feet.
 5. Weight: 1.2 lb/sq. ft.
 6. Surfacing: Primed Fiberglass Mat.
 7. Flexural Strength, Parallel (ASTM C473): 40 lbf, minimum.
 8. Flute Span (ASTM E661): 2-5/8 inches.
 9. Permeance (ASTM E96): Greater than 30 perms.
 10. R-Value (ASTM C518): 0.28.
 11. Water Absorption (ASTM C473): Less than 5 percent of weight.
 12. Surface Water Absorption (ASTM C473): Nominal 1.0 grams.
 13. Compressive Strength (Applicable Sections of ASTM C472): Nominal 900 pounds per square inch.
 14. Flame Spread/ Smoke Development (ASTM E84): Not more than 0 Flame Spread, 0 Smoke Development
 15. Combustibility (ASTM E136): Noncombustible
 16. Fire resistance rating (UL 790 and ASTM E108): Class A
 17. Mold Resistance (ASTM D3273): Scored a 10

PART 3 EXECUTION

3.01 INSTALLATION

- A Apply only as many roof boards as can be covered by a roof membrane system in the same day.
- B Board edges and ends shall be butted tightly together; do not gap edges or ends.
- E. Installation Directly on Plywood Decking:
1. Install roof boards with long edges bearing on and parallel to roof joists, so that edges are supported.
 2. Stagger roof board end and edge joints minimum 6".
 3. Mechanically fastened to a plywood deck: Please fasten DensDeck® Prime Roof Board in accordance to system manufacturer's recommendations. Number of fasteners required per wind load.
- G. Following roofing system installation, avoid leaks and properly manage water accumulation.
1. Eliminate moisture vapor movement by convection and control the flow of water by gravity through imperfections in the roof system.
 2. After a leak has occurred, do not allow condensation on the upper surface of the

roof membrane, and all moisture accumulations as a result of the leak shall be removed, leaving dry substrates and materials.

3.02 PROTECTION

- A. Protect roof board installations from damage and deterioration until the date of Substantial Completion.

END OF SECTION 07 22 20

SECTION 07 32 00

ROOF TILES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Formed concrete roofing tiles.
 2. Underlayment, flashings and nailers.

1.2 Related Sections:

1. Section 06 10 00 – Rough Carpentry.
2. Section 07 62 00 – Sheet Metal Flashing and Trim.

1.3 REFERENCES

- A. ASTM International (ASTM)
1. ASTM A 641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 2. ASTM C 1492 - Standard Specification for Concrete Roof Tile.
 3. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1997a.
 4. ASTM D 249 - Standard Specification for Asphalt Roll roofing (Organic Felt) Surfaced with Mineral Granules: 1989 (reapproved 1996).
 5. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 6. ASTM D 2626 - Standard Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing; 1997b.
 7. ASTM D 4798 - Standard Practice for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method).
 8. ASTM D 4869 - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing.
 9. SMACNA – Architectural Sheet Metal Manual.
- B. City of Los Angeles Research Report - LA RR 25021.
- C. FRSA/TRI - Concrete and Clay Roof Tile Installation Manual Fifth Edition Revised (For Outside HVHZ Wind Zones).
- D. IAPMO ER 1900.
- E. IAPMO ER 2015 Concrete and Clay Roof Tile Installation Manual.
- F. ICC AC 180 - Acceptance Criteria for Clay and Concrete Roof Tiles. August 2007.
- G. ICC ER ESR 1787 Flex Seal, Flex Flash, Flex Vent.
- H. Concrete and Clay Roof Tile Installation Manual (TRI) - Concrete and Clay Design Criteria for Cold and Snow Regions.

1.4 DESIGN REQUIREMENTS

- A. Roofing tile materials and installation shall conform to the requirements of the 2019 California Building Code.

1.5 SUBMITTALS

- A. Submit samples under provisions of Section 01 30 00.
- B. Submit two sample full size, illustrating finish, color and texture. Include range samples if variation of finish is anticipated.
- C. Product Data: Manufacturer's data for each product to be used including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- D. Certificates of Compliance: Submit to certify compliance with referenced standards.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Member of the Tile Roofing Institute.
 - 2. Company specializing in forming concrete roof tiles with minimum three (3) years of experience.
- B. Install Qualifications: License by the local/state authority, and have proper insurance to operate in your area.
- C. Installation: refer to the Concrete and Clay Roof Tile Installation Manual ER 2015, FRSA/TRI Concrete and Clay Roof Tile Installation Manual Fifth Edition Revised, TAS 101 and RAS 118, 119, 120 for High Wind Zones (HVHZ).
- D. Product Requirements:
 - 1. Comply with 2019 California Building Code.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle and store materials in accordance with manufacturer's instructions.
 - 1. Refer to the FRSA TRI 07320/8-05 Concrete and Clay Roof Tile Installation Manual Fifth Edition Revised section #1.04.
 - 2. Refer to roof loading guide MC-09 of the Concrete and Clay Roof Tile Installation Manual IAPMO ER 2015.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Maintain dry storage area for products of this section until installation of products.

1.8 TESTING

- A. Concrete tile testing to conform to Section 01 41 00 and DSA IR 15-2.
- B. Fire Test: Class "A" Tests to ASTM E108 or UL 790 per 2019 CBC Section 1505.

1.9 WARRANTY

- A. Manufacturer shall warrant the products against manufacturing defects and shall include material and labor to repair or replace defective materials as specified in manufacturer's warranty.
 - 1. Warranty Period – Concrete Roof Tile: Lifetime Transferrable Limited Product Warranty for concrete roof tile.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Eagle Roofing Products, (800) 400-3245, www.eagleroofting.com
- B. Westlake Royal Roofing, (800) 669-8453, www.westlakeroyalroofing.com
- C. Substitutions: Under provisions of Section 01 30 00.

2.2 ROOFING MATERIALS

- A. Concrete Tiles: Ponderosa type by Eagle Roofing Products Company, nominal size, (approximately 9.5 lbs. per sq. ft.); 2 holes provided for attachment; special shapes to suit valley, ridge, eave, and other conditions; color to be selected by Architect from full range of colors.
- B. Underlayment: 2 layers of Layfast SBS TU43 as manufactured by MBTechnology, (800) 621-9281, ASTM D226, Type II.
- C. Nails: Use copper, brass or stainless-steel nails, 11 ga. minimum.
- D. Plastic Cement: ASTM D2822; asphaltic type with mineral fiber components.
- E. Lap Cement: Fibrated cutback asphaltic type, as recommended for use as an adhesive in the cold application of asphalt roofing or underlayment; free of toxic solvent.
- F. Deck Tape: 2" wide aluminum coated cloth duct tape with adhesive backing.
- G. Nailers: Softwood lumber, preservative treated by pressure.
- H. Accessories:
 - 1. Manufacturer's eave closure strips. Color to be selected by Architect from full range of colors.
 - 2. Malleable metal tile flashing (painted) to match roof tile profile.
- I. Wire: Copper, 16 ga.

2.3 FLASHING MATERIAL

- A. Sheet metal flashings: As per Section 07 62 00.
- B. Bituminous Paint: Acid and alkali resistant type; black color.
- C. Nails: As required per CBC Sections 1507.3 and 1513.

2.4 FLASHING FABRICATION

- A. Form flashing to profiles indicated, and to protect roof assembly and shed water.
- B. Form sections square, true, and accurate to profile, in maximum possible lengths, free from distortion and other defects detrimental to appearance or performance.
- C. Hem exposed edges of flashing minimum 1/4 inch on underside.
- D. Apply bituminous paint on concealed surfaces of flashing.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that roof deck surfaces are dry, sound, flat, and of sufficient thickness to accept fasteners.
- B. Beginning of installation means acceptance of substrate.
- C. All installations shall comply with Table 1507.3.7 of the C.B.C and DSA IR 15-2.

3.2 PREPARATION

- A. Seal roof deck joints wider than 1/16" with deck tape.
- B. Coordinate installation of roof mounted components, or work projecting or penetrating through roof. Verify roof openings are prepared prior to installing work of this Section.

3.3 EAVE PROTECTION INSTALLATION

- A. Place eave edge flashing tight with fascia boards. Weather lap joints 2" and seal with plastic cement. Secure deck flange with nails.
- B. Apply 4" wide band of plastic cement over deck flange of eave edge flashing, and embed an 18" wide strip of underlayment. Place underlayment with eave edge flush with face of flashing. Secure in place. Lap ends minimum 6".
- C. Apply lap cement at a rate of approximately 1-1/4 gal/square on underlayment starter strip.
- D. Starting from eave edge of starter strip, lay additional 36" wide strips of underlayment in lap cement, to produce a two-ply membrane. Weather lap plies minimum 19" and nail in place. Lap ends minimum 6". Stagger end joints of each consecutive ply.
- E. Extend eave protection membrane minimum 4'-0" beyond interior face of walls.

3.4 PROTECTIVE UNDERLAYMENT INSTALLATION

- A. Place two plies of underlayment over deck area with ends and edges weather lapped minimum 6" solidly cemented together at eaves.
- B. Stagger end laps of each consecutive layer. Indicate manner of attachment or underlayment. Staple or nail in place with roofing nails.
- C. Install perpendicular to slope of roof.

D. Weather lap and seal items projecting through or mounted on roof with plastic cement.

E. Embed wood nailers in plastic cement before through nailing.

3.5 FLASHING INSTALLATION

A. Install flashing in accordance with SMACNA Architectural Sheet Metal Manual requirements.

B. Weather lap joints minimum 2" and seal with plastic cement. Secure with concealed fasteners.

C. Flash and seal work projecting through or mounted on roofing with plastic cement. Provide weather tight installation.

3.6 ROOF TILE INSTALLATION

A. Install in accordance with DSA approved standard detail, as shown in approved drawings, and CBC 1507.3 and 1513.

B. Complete installation to provide weather tight service.

END OF SECTION

SECTION 07 53 16

KETONE ETHYLENE ESTER MEMBRANE ROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Single-Ply Ketone Ethylene Ester Membrane Roofing
 - 2. Thermoplastic Clad Flashing Metal
 - 3. Flexible Membrane Base Flashings
 - 4. Roofing Membrane Expansion Joints
 - 5. Counter Flashings
 - 6. Walkway Surfaces
 - 7. Accessories

- B. Related Sections
 - 1. Section 06 10 00: Rough Carpentry
 - 2. Section 07 62 00: Sheet Metal Flashing and Trim.
 - 3. Section 07 90 00: Joint Protection.
 - 4. Division 22: Plumbing Specialties.

1.2 REFERENCES

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and The Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
- B. ASTM D 6754 – 02 Standard Specification for Ketone Ethylene Ester (KEE) Sheet Membranes.
- C. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastics Elastomers.
- D. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastic Elastomers by Impact.
- E. ASTM D1004 - Standard Test Method for Initial Tear Resistance of Plastic Film.
- F. ASTM D1004 - Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials.
- G. ASTM E96 - Standard Test Method for Water Vapor Transmission
- H. ASTM E903 - Standard Test Method for Solar Absorption, Reflectance, and Transmission of Materials Using Integrating Spheres.
- I. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings
- J. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- K. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- L. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.

- M. Warnock Hersey (WH): Fire Hazard Classifications.
- N. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- O. ASCE 7, Minimum Design Loads for Buildings and Other Structures
- P. UL - Fire Resistance Directory.
- Q. CRCC – Cool Roof Rating Council – Product Rating Program CRCC-1.
- R. CBC – California Building Code, (CCR) California Code of Regulations, Title 24, Part 6.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation instructions.
- C. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins. Report shall be signed and sealed by a Professional Engineer registered in the State of the Project who has provided roof system attachment analysis for not less than 5 consecutive years.
- D. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- E. Provide signature from corporate officer of manufacturer stating compliance with manufacturers required site inspections as outlined in Section 3.6.
- F. Applicator Qualifications: Submit manufacturer's written acceptance of applicator.
- G. Provide documentation supporting compliance with requirement that membrane meets ASTM D 6754 requiring KEE Membranes to have at least 52% Evaloy in membrane sheet.
- H. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.

- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.5 PRE-INSTALLATION CONFERENCE

- A. Convene minimum two weeks prior to commencing Work of this section in accordance with Section 01 30 00
- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
 1. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
 2. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.6 REGULATORY REQUIREMENTS

- A. All work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation in accordance with provisions in Section 01 50 00.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.

- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.8 PROJECT CONDITIONS

- A. Maintain surfaces clean of dirt and dust during and after installation of roofing system.
- B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 COORDINATION

- A. Sequence, schedule and coordinate work under the provisions of Section 01 30 00.

1.10 WARRANTY

- A. Provide 20-Year warranty & roofing installers warranty under the provisions of Section 01 70 00.
- B. Upon completion of the work, provide the Manufacturer's written and signed NDL Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
 - 1. Warranty Period:
 - a. 20 years from date of acceptance.
- C. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
 - 1. Warranty Period:
 - a. 5 years from date of acceptance.

1.12 MAINTENANCE

- A. Submit maintenance materials under provisions of Section 01 70 00.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Garland Industries, (800) 321-9336, or equal.
- B. Johns Manville, (800) 922-5922.
- C. Carlisle SynTec, (800) 479-6832.
- D. Substitutions: Under provisions of Section 01 33 00.

2.2 MATERIALS

- A. Materials and systems specified are products of Garland, unless otherwise indicated. Similar materials and systems of the above named manufacturer, will be considered acceptable when complying with Class A, FM I-90 requirements. Alternates must be approved prior to bid by Architect.

2.3 COMPONENTS

- A. Membrane: 60-mil ethylene interpolymer (EIP) membrane, reinforced with a 7.5 oz knitted polyester fabric as manufactured by Garland Industries, exceeding all requirements outlined in ASTM D 6754 – 02 Standard Specification for Ketone Ethylene Ester (KEE) Sheet Membranes.
- B. Membrane Adhesives: As recommended by membrane manufacture. Shall Meet South Coast Air Quality Management District Rule 1168.
- C. Flashing adhesive.
- D. Thinner and Cleaner: AS recommended by adhesive manufacture.
- E. Barrier Board: Glass Matte gypsum protection board as specified in Section 07 22 20.
- F. Flexible Membrane Base Flashing: Same material as field membrane.; white color.
- G. Flashing Metal: SolarClad Metal
- H. Counterflashing: Galvanized sheet metal, as specified in Section 07 62 00.
- I. Prefabricated Control or Expansion Joint Flashing: KEE Membrane over polypropylene foam backing rod sized 1.5 x joint width. Seamed to roof membrane.

2.4 ACCESSORIES

- A. Roofing Nails and Screws: Galvanized or non-ferrous type, Size as required to suit application with compatible plates.
- B. Sealants: As recommended by membrane manufacture. Shall meet South Coast Air Quality Management District Rule 1168.
- C. Sealing Mastic: One part gun grade butyl.
- D. Strip Reglet Devices: Galvanized sheet metal.
- E. Walkway Pads: PVC membrane with textured top surface finish, white color. 0.15 inch thick 2'x6' wide x 50'-0" long.
- F. Stack Boots: Prefabricated flexible molded PVC boot and collar for pipe stack penetrations through membrane and stainless steel clamping bands. 0.075 inch thick. Size to accommodate round and square tubes.
- G. Wood Nailers: Pressure treated wood nailers as specified in Section 06 10 00.
- H. Copper Sheet: ASTM B370, Temper H00 of H01, cold rolled copper sheet, 16oz/sq. ft.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that the surfaces and site conditions are ready to receive work.
- B. Verify that the deck is supported and secured.

- C. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.
- D. Verify that the deck surfaces are dry and free of ice or snow.
- E. Verify that all roof openings or penetrations through the roof are solidly set, and that all flashings are tapered.
- F. Verify that required utilities are available, in proper locations and ready for use.
- G. Correct deficiencies prior to commencing with Work of this Section.
- H. Beginning of installation means installer accepts existing surface substrate conditions.

3.2 PREPARATION

- A. General: Clean surfaces thoroughly prior to installation.
 1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
 3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
 4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
 5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
 6. Fasteners and plates for fastening components mechanically to the substrate shall provide a minimum pull-out capacity of 300 lbs. (136 k) per fastener. Base or ply sheets attached with cap nails require a minimum pullout capacity of 40 lb. per nail.

3.3 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 40 00.
- B. Manufacturer's representative to inspect surface prior to installation.
- C. Require weekly site attendance of roofing and insulation materials' manufacturers during installation of the Work.
- D. Manufacturer's field representative to provide interim inspections at determined intervals.
- E. Defective Work: Where testing indicates defective roofing, remove and replace to extent required by the District's Inspection Agency, at no additional cost to the District.

3.4 ROOF PROTECTION

- A. Protect all partially and fully completed roofing work from other trades until completion under provisions of Section 01 50 00.
- B. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.

- C. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed roof areas from traffic and point loading during the application process.
- D. Temporary tie-ins shall be installed at the end of each workday and removed prior to commencement of work the following day.
- E. Do not permit traffic or material storage on completed roof surfaces. When unavoidable, provide walk treads or insulation boards.

3.5 INSTALLATION - GENERAL

- A. Install KEE membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual and applicable codes.
- B. General: Avoid installation of membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:
- C. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
- D. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must be replaced with roll from a heated storage area.
- E. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water.

3.6 INSTALLATION MECHANICALLY ATTACHED KEE MEMBRANE

- A. Rolls of KEE Membrane are to be positioned and installed straight and snug but not taut. Stretching of the membrane places undue stress on the mechanical fasteners.
- B. If using custom fabricated rolls, align the paneled rolls to stagger the factory seams to prevent adjacent welds from falling on top of one another. Adjoining rolls shall overlap five inches and be properly shingled with the flow of water where possible. It is not uncommon and is acceptable for the factory laps to "buck" water.
- C. The properly positioned membrane shall be attached using approved fasteners and stress plates installed through the membrane and insulation assembly and engage the structural decking.
- D. The approved stress plates shall be installed straight and parallel to existing structural purlin members. All stress plates must set completely on the membrane allowing a minimum of 1/2 inch from the edge and allow sufficient room to facilitate welding.
- E. Fastener row spacing and intervals shall be established to resist design pressures, determined in compliance with procedures outlined within the current publication of ASCE Standard 7. Alternative designs may be determined using the criteria within Factory Mutual Research Loss Prevention Data.

- F. Perimeter zone and corner zone enhancement is required on all mechanically fastened roofing systems. Perimeters and corners are defined as follows:
 - 1. Perimeter: 10% of the width of the roof areas or 40% of the height of the roof area, whichever is less to a minimum of 4-ft. Perimeter zones run parallel to all external roof edges including those with parapet walls.
 - 2. Corner zones are the square intersection of perimeters.
 - 3. Projects having variable roof levels shall treat the outer boundary of each level as a perimeter. Internal expansion joints, firewalls or adjoining building walls greater than 4 feet are not considered perimeter areas.
- G. Perimeters and corners may be enhanced by:
 - 1. Installing “half” rolls of membrane fastened as prescribed by project requirements. Adding additional rows of fasteners through the top of the membrane system within the perimeter at prescribed intervals area and sealing with a 6 inch strip
- H. Hot Air Welding:
 - 1. Hot Air Welding: All field seams exceeding 10 feet in length shall be welded with an approved automatic welder.
 - 2. All field seams must be clean and dry prior to initiating any field welding.
 - 3. Remove foreign materials from the seams (dirt, oils, etc.) with Acetone or authorized alternative. Use CLEAN WHITE COTTON cloths and allow approximately five minutes for solvents to dissipate before initiating the automatic welder. Do not use denim or synthetic rags for cleaning.
 - 4. All welding shall be performed only by qualified personnel to ensure the quality and continuity of the weld. Contaminated areas within a seam will inhibit proper welding and will require a membrane patch

3.7 INSTALLATION KEE MEMBRANE FLASHINGS

- A. Clean all vents, pipes, conduits, tubes, walls, and stacks to bare metal. All protrusions must be properly secured to the roof deck with approved fasteners. Remove and discard all lead, pipes and drain flashing. Flash all penetrations according to approved details.
- B. Remove all loose and/or deteriorated cant strips and flashing.
- C. Flash all curbs, parapets and interior walls in strict accordance with approved details.
- D. All flashing shall be adhered to properly prepared, approved substrate(s) with either KEE Mastic or Bonding Adhesive applied in sufficient quantity to ensure total adhesion.
- E. The base flange of all membrane flashing shall extend out on to the plane of the deck, beyond the wood nailers to a maximum width of 8 inches. Vertical flashing shall be terminated no less than 8 inch above the plane of the deck with approved termination bar and counter-flashing or metal cap flashing. When using Mastic as the adhesive, vertical wall flashing termination shall not exceed 30 inches without supplemental mechanical attachment of the flashing between the deck and the termination point of the flashing.
- F. Complete all inside and outside corner flashing details with pre-formed corners or an approved field fabrication detail.
- G. Probe all seams with a dull, pointed probe to ensure the weld has created a homogeneous bond.
- H. Install penetration accessories in strict accordance with approved details. Ensure penetration accessories have not impeded in any way the working specification. (Refer to the related trade for the technical specification).

3.8 METAL FLASHINGS

- A. All perimeter edge details are to be fabricated from SolarClad Metal.
- B. Ensure all fascia extend a minimum of 2 inch lower than the bottom of the wood nailers.
- C. Fasten all metal flashing to wood nailers or approved substrate with approved fasteners 8 inches on center.
- D. Break and install SolarClad metal in accordance with approved details, ensuring proper attachment, maintaining 1/2 inch expansion joints and the installation of a minimum 2 inch bond breaker tape prior to sealing the joint.
- E. Solidly weld SolarClad expansion joints with a 6 inch strip of membrane welded to the SolarClad, covering the bond breaker tape (cover plates are optional).
- F. Roof Drains
 1. Flash all roof drains in accordance with roof drain details.
 2. Replace all worn or broken parts that may cut the membrane or prevent a watertight seal. This includes the clamping ring and strainer basket.
 3. Replace all drain bolts or clamps used to hold the drain compression ring to the drain bowl.
 4. Non-reinforced 60 mil membrane shall be used for flashing the drain assembly. Drain assemblies and basins or "sumps" must be free of any asphalt or coal tar pitch residue prior to installation.
 5. The drain target sheet should be sized and installed to provide for a minimum of 12 inch of exposed 60 mil on all sides of the drain.

3.9 EXPANSION JOINTS

- A. Flash all expansion joints in accordance with authorized details. Fasten all expansion joint material according to details. Ensure the expansion material has sufficient material to expand to the widest point in expansion without causing undue stress on the expansion joint material.

3.10 SEALANTS

- A. Apply authorized sealant(s) to all surface mounted reglets and per project requirements. Sealant(s) are to shed water. Follow all manufacturer's instructions and installation guides.
- B. Use primer when recommended by the manufacturer.
- C. Sealants will require periodic maintenance by the building owner's maintenance personnel.

3.11 TEMPORARY SEALS

- A. At the end of each working day or at the sign of rain, install temporary, 100% watertight seal(s) where the completed new roofing adjoins the uncovered deck or existing roof surface.
- B. The authorized roofing contractor shall create and maintain the temporary seal in such a manner to prevent water from traveling beneath the new and/or existing roof system.
- C. The use of plastic roofing cement is permissible when sealing to an existing built up roof.
- D. If water is allowed to enter beneath the newly completed roofing, the affected area(s) shall be removed and replaced at no additional expense to the building owner.

- E. Prior to the commencement of work, cut out and remove all contaminated membrane, insulation, roof cement or sealant and properly dispose off site.

3.12 WALKWAYS

- A. Solar Brite walkways and protection pads shall be installed at staging areas for roof top equipment maintenance or areas subject to regular foot traffic.
- B. Walkway Installation
 1. Roofing membrane to receive walkway material shall be clean and dry.
 2. Cut and position the walkway material as directed by the specifications or agreement.
 3. Hot air weld the entire perimeter of the walk way to the previously cleaned roofing membrane. Avoid excessive heating of the walk way material to prevent scorching the underlying roofing membrane.

3.13 CLEAN-UP

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove asphalt markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.14 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.15 FIELD QUALITY CONTROL

- A. Inspection: Provide manufacturer's field observations at minimum of (2) days per week. Provide a final inspection upon completion of the Work.
 1. Warranty shall be issued upon manufacturer's acceptance of the installation.
 2. Field observations shall be performed by a Sales Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
 3. Provide observation reports from the Sales Representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
 4. Provide a final report from the Sales Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

3.16 SCHEDULES

- A. Thermoplastic KEE (Ply) Sheet:
 - 1. SolarBrite KEE: 60 mil thermoplastic, ketone ethylene ester (KEE) roofing membrane with polyester scrim. ASTM D6754
 - a. Breaking Strength, ASTM D 751, Proc. B, strip
 - 1) 350 lbf. (1,557 N)
 - b. Tear Strength ASTM D 751
 - 1) 100 lbf. min. (445 N)
 - c. Elongation at Break (%), ASTM D 751, Proc. B, Strip
 - 1) 18.0%
 - d. Tensile Strength (PSI) ASTM D882; 8500
- B. Base Flashings:
 - 1. Flashing Cap (Ply) Sheet:
 - a. SolarBrite KEE 60 Flashing: 60 mil thermoplastic, ketone ethylene ester (KEE) roofing membrane with polyester scrim. ASTM D 6754.
 - 1) Breaking Strength, ASTM D 751, Proc. B, strip
 - a) 350 lbf
 - 2) Tear Strength ASTM D 751
 - a) 100 lbf. minimum.
 - 3) Elongation at Break (%), ASTM D 751, Proc. B, Strip
 - a) 18.0%

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coping parapet and cap flashings.
- B. Roof and sill flashings.
- C. Counterflashings over bituminous base flashings.
- D. Counterflashings at roof mounted mechanical equipment and vent stacks.
- E. Counterflashings for roof hatches.

1.2 REFERENCES

- A. ASTM B32 - Solder Metal.
- B. ASTM A526 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process, Commercial Quality.
- C. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- D. FS SS-C-153 - Cement, Bituminous, Plastic.
- E. SMACNA - Architectural Sheet Metal Manual.

1.3 SYSTEM DESCRIPTION

- A. Work of this Section is to physically protect membrane roofing, and base flashings, from damage that would permit water leakage to building interior.

1.4 QUALITY ASSURANCE

- A. Applicator: Company specializing in sheet metal flashing work with five years minimum experience.

1.5 STORAGE AND HANDLING

- A. Store products under provisions of Section 01 50 00.
- B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation.
- C. Prevent contact with materials during storage which may cause discoloration or staining and moisture.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Pre-Coated Galvanized Steel: ASTM A446, Grade A, G90 zinc coating; 22 gage core steel, shop pre-coated with Kynar 500 coating, color to be selected by Architect from manufacturer's full range of colors.

2.2 ACCESSORIES

- A. Fasteners: Galvanized steel or stainless steel with soft neoprene washers at exposed fasteners. Finish exposed fasteners same as flashing metal.
- B. Underlayment: ASTM D266, No. 30 asphalt saturated roofing felt.
- C. Metal Primer: As specified in Section 09 90 00.
- D. Protective Backing Paint: Zinc chromate alkyd.
- E. Slip Sheet: Rosin sized building paper.
- F. Sealant: Type specified in Section 07 90 00.
- G. Bedding Compound: Rubber-asphalt type.
- H. Plastic Cement: FS SS-C-153, Type I-asphaltic base cement.
- I. Reglets: Recessed galvanized steel manufactured by Fry Reglets Corporation face ends covered with plastic tape.
- J. Solder: ASTM B32; 50/50 tin/lead type, with rosin flux.

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.
- C. Form pieces in longest practical lengths.
- D. Hem exposed edges on underside 1/2 inch miter and seam corners.
- E. Form material with flat lock seam.
- F. Solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean.
- G. Fabricate corners from one piece with minimum 18" long legs; seam for rigidity, seal with sealant.
- H. Fabricate vertical faces with bottom edge formed outward 1/4" and hemmed to form drip.
- I. Fabricate flashings to allow toe to extend 2" over roofing surface. Return and brake edges.
- J. Form sheet metal pans 6" nominal square size, with 3" upstand, and 4" flanges. Fill pans watertight with plastic cement.

2.4 FINISH

- A. Parapet coping: Kynar factory finish with 0.2 mil baked on primer and 0.8 mil baked on topcoat for a 1.0 mil dry film thickness. Finish shall be warranted for a minimum of 20 years against all defects.
- B. All other flashings and trims: Shop primed and field painted per Section 09 90 00.
 - 1. Shop prepare and prime exposed ferrous metal surfaces.
 - 2. Backpaint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
- B. Verify roofing membrane termination and base flashings are in place, sealed, and secure.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, and cleats before starting installation.
- C. Insert flashings into reglets to form tight fit. Secure in place with lead wedges at maximum 12" o.c. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.
- D. Secure flashings in place using concealed fasteners.
- E. Lap, lock, seam and seal all joints.
- F. Apply plastic cement compound between metal flashings and felt flashings.
- G. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- H. Seal metal joints watertight.

3.3 INSTALLATION

- A. Conform to SMACNA manual.

END OF SECTION

SECTION 07 71 23

MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Precoated galvanized steel gutters and downspouts.
 - 2. Precast concrete splash blocks.
- B. Related Sections:
 - 1. Section 07 61 03 - Manufactured Sheet Metal Roofing.
 - 2. Section 07 90 00 - Joint Protection.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A446 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
 - 2. ASTM A525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- B. SMACNA - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Indicate on shop drawings, material profile, jointing pattern, jointing details, fastening methods, and installation details.
- C. Submit samples under provisions of Section 01 33 00.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and protect products under provisions of Section 01 50 00.
- B. Prevent contact with materials during storage which may cause discoloration or staining.

1.5 WARRANTY

- A. Provide two year warranty under provisions of section 01 70 00.
- B. Warranty: Include coverage for degradation of metal finish, water tightness, and integrity of seals.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Pre-coated Galvanized Steel for Gutters: ASTM A446, G90 gage as specified, steel, shop pre-coated with Kynar 500 coating of color to match sheet metal roofing.

2.2 COMPONENTS

- A. Gutters: 22 gage, profile indicated on drawings.
- B. Downspouts: 3" diameter Schedule 40 pipe, galvanized inside and out, painted.
- C. End Caps, Downspout Outlets, Rain Diverters, Straps, Support Brackets, Joint Fasteners. Profiled to suit gutters and downspouts.
- D. Splash Blocks: Precast concrete type, of sizes and profiles indicated; minimum 3,000 psi at 28 days, with minimum 5 percent air entrainment.

2.3 ACCESSORIES

- A. Anchorage Devices: Meet SMACNA requirements.
- B. Protective Backing Paint: Zinc chromate alkyd. Oxide linseed oil paint.
- C. Sealant: As specified in Section 07 90 00.

2.4 FABRICATION

- A. Form gutters and downspouts of profiles and sizes indicated.
- B. Field measure site conditions prior to fabricating work.
- C. Fabricate with required connection pieces.
- D. Form sections square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.
- E. Hem exposed edges of metal.
- F. Seal metal joints.
- G. Fabricate gutter and downspout accessories; seal watertight.
- H. Provide expansion joint in gutters every 30'-0" o.c.

2.5 SHOP FINISHING

- A. Kynar factory finish with 0.2 mil baked on primer and 0.8 mil baked on topcoat for a 1.0 mil dry film thickness. Finish shall be warranted for a minimum of 20 years against all defects.
- B. Shop prepare and prime exposed ferrous metal surfaces.
- C. Backpaint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.

- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with SMACNA requirements.
- B. Join lengths with seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Apply backing paint to metal back surfaces.
- D. Seal metal joints watertight.
- E. Set splash blocks under downspouts.

END OF SECTION

SECTION 07 72 33

ROOF HATCHES AND ACCESS LADDERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum access ladders.

1.2 RELATED SECTIONS

- A. Section 05 50 00 Metal Fabrications: Fasteners and installation requirements used to attach ladders to structure.

1.3 REFERENCES

- A. AA – Aluminum Association
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- D. OSHA 1910.27 – Fixed Ladders.
- E. Comply with 2022 California Building Code

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations and details where applicable.
- C. Indicate welded connections using standard A2.0 welding symbols. Indicate net weld lengths.

1.5 QUALIFICATIONS

- A. Welders' Certificates: Submit under provisions of Section 01 33 00, certifying welders employed on the work, verifying AWS qualifications within the previous 12 months.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.
 - 1. Record of successful in-service performance.
 - 2. Sufficient production capacity to produce required units.
 - 3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.

- C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on Drawings.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurement before fabrication.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

1.10 WARRANTY

- A. Manufacturer has responsibility for an extended Corrective Period for work of this Section for a period of 5 years commencing on the shipment date of the product against all the conditions indicated below, and when notified in writing from Owner, manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.
 - 1. Defects in materials and workmanship.
 - 2. Deterioration of material and surface performance below minimum OSHA standards as certified by independent third party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
 - 3. Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.
- B. Manufacturer shall be notified immediately of defective products, and be given a reasonable opportunity to inspect the goods prior to return. Manufacturer will not assume responsibility, or compensation, for unauthorized repairs or labor. Manufacturer makes no other warranty, expressed or implied, to the merchantability, fitness for a particular purpose, design, sale, installation, or use, of the ladder; and shall not be liable for incidental or consequential damages, losses of or expenses, resulting from the use of ladder products.

PART 2 PRODUCTS

2.1 ACCEPTABLE ROOF HATCH MANUFACTURERS

- A. Babcock-Davis Hatchways, Inc., Arlington, MA, (408) 241-9100.
- B. Bilco Co., New Haven, CT, (415) 467-9235.
- C. Bristol Fiberlite Industries, Santa Ana, CA, (800) 422-2131.
- D. Substitutions: Under provisions of Section 01 33 00.

2.2 ROOF HATCHES

- A. Unit: Sizes shown single leaf type unless otherwise indicated.

- B. Curb: 14 gage galvanized prime painted steel with one inch rigid insulation; integral cap flashing to receive roof flashing system; extended flange for mounting.
- C. Cover: 14 gage galvanized prime painted steel with one inch glass fiber insulation retained by 22 gage steel inner liner. Continuous gasket to provide weatherproof seal.
- D. Hardware: Manufacturer's standard manually operated type with compression spring operators, positive snap latch with turn handles inside and out and padlock hasp inside; automatic hold-open arm with vinyl covered grip handle for easy release; cadmium plated finish.
- E. Hinges: Manufacturer's recommended type.
- F. Ladder Extension: Provide "BILCO" Ladder-up pole extension assembly and security door where shown.

2.3 ACCEPTABLE LADDER MANUFACTURERS

- A. Acceptable Manufacturers:
 1. O'Keeffe's, Inc.; 100 N Hill Drive, Suite 12, Brisbane, CA 94005. Toll Free Tel: (888) 653-3333. Tel: (415) 824-4900. Fax: (415) 824-5900. Email: info@okeeffes.com. Web: <http://www.okeeffes.com>.
 2. Substitutions: Under provisions of Section 01 60 00

2.4 APPLICATIONS/SCOPE

- A. Fixed and Cage Ladder Design:
 1. Safety cages are required on ladders over 24 feet (7315 mm)
 2. Safety cages are required on all ladders in high or hazardous areas.
 3. Landing platforms are required at 50 feet (15,240 mm) above the bottom of the ladder.
 4. Rail and harness fall arrest system as alternate to safety cage and landing platforms shall be a permissible manufacturer's option.
 - a. Fixed Ladder Bottom Bracket.
 - b. Bottom floor supported bracket.
 - c. Bottom wall supported bracket.
 5. Bracket as drawn.
- B. Fixed Access Ladder:
 1. Heavy Duty Tubular Rail Fixed Access Ladder:
 - a. Model 501 as manufactured by O'Keeffe's Inc., with optional safety post.
 - b. Security Door, where called for on Drawings.
 2. Tubular Rail High Parapet Access Ladder with Platform and Return
 - a. Model 503 as manufactured by O'Keeffe's Inc.

2.5 FINISHES

- A. Mill finish. As extruded.
- B. Clear Anodic Finish: AA-M10C22A41 Mechanical finish as fabricated. Architectural Class I, clear coating 0.018 mm or thicker.

2.6 MATERIALS

- A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.
- B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

2.7 FABRICATION

- A. Rungs: Not less than 1-1/4 inches (32 mm) in section and 18-3/8 inches (467mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides.
 - 1. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.
- B. Channel Side Rails: Not less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide.
- C. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.
- D. Security Doors: Formed 1/8 inch (3 mm) thick aluminum sheet. Security panels shall extend on both sides, perpendicular to the door face, to within 2 inches (51 mm) of the wall. Security door shall be furnished with continuous aluminum piano hinge and heavy duty forged steel locking hasps.
- E. Ladder Safety Post: Retractable hand hold and tie off.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.
- C. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- D. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.
- C. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
- D. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated on Drawings.

- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain Architect approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Repair galvanized surfaces after welding with zinc rich paint, conforming to ASTM A-780.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
 1. Floors.
 2. Roofs.
 3. Walls and partitions.
 4. Smoke barriers.
 5. Construction enclosing compartmentalized areas.
- B. Related Sections include the following:
 1. Section 03 30 00 "Cast-in-Place Concrete" for construction of openings in concrete slabs and walls.
 2. Division 7 Section "Insulation and Isolation" for safing insulation and accessories.
 3. Division 22 Sections specifying piping penetrations.
 4. Division 23 Sections specifying duct penetrations.
 5. Division 26 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 3. Fire-resistance-rated floor assemblies.
 4. Fire-resistance-rated roof assemblies.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 1. Penetrations located outside wall cavities.
 2. Penetrations located outside fire-resistive shaft enclosures.
 3. Penetrations located in construction containing fire-protection-rated openings.

4. Penetrating items larger than 4 inch diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
 - E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction penetrated, relationships to adjoining construction and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 1. Submit documentation , including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems 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.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, SFM (State Fire Marshal) or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
 - 2) ITS in "Directory of Listed Products."
 - 3) State Fire Marshal Listed

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

END OF SECTION

SECTION 07 90 00

JOINT PROTECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preparing sealant substrate surfaces.
- B. Sealant and backing.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
 - 2. ASTM C804 - Use of Solvent-Release Type Sealants.
 - 3. ASTM 962 - Guide for Use of Elastomeric Joint Sealants.
- B. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Submit product data indicating sealant chemical characteristics, performance criteria, limitations, color availability .
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit two samples 4" long in size illustrating colors selected.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five years documented experience.
- B. Applicator: Company specializing in applying the work of this Section with minimum three years documented experience, approved by sealant manufacturer.
- C. Conform to Sealant and Waterproofers Institute requirements for materials and installation.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers and products are listed for each sealant type.
- B. Substitutions: Under provisions of Section 01 60 00.

2.2 SEALANTS

- A. Acrylic Sealant: One-part, nonsag solvent-release-curing, acrylic terpolymer sealant complying with ASTM C920 for Type S; Grade NS; except for selected test properties which are revised as follows: Heat aged hardness; 40-50. Weight loss, 15 percent; maximum cycle movement capability, plus or minus 12-1/2 percent.
 - 1. Protective Treatments Inc., "PT1 738".
 - 2. Protective Treatments Inc., "PT1 767".
 - 3. Tremco Inc., "Mono."
- B. Butyl Sealant: One-part, nonsag solvent-release-curing sealant complying with FS TT-S-001657 for Type 1 and formulated with a minimum of 75% solids.
 - 1. Bostik Construction Products Div., "Chem-Calk 300".
 - 2. Pecora Corp. "BC-158".
 - 3. Tremco Inc., "Tremco Butyl Sealant."
- C. Polysulphide Sealant: One-part chemical curing elastomeric sealant complying with ASTM C920, Type S; Grade NS, Class 12-1/2.
 - 1. Bostik Construction Products Div., "Chem-Calk 400".
 - 2. Pecora Corp., "GC-9".
 - 3. Product Research & Chemical Corp., "PRC Rubber" Nonacid Calk 7000.
- D. Silicone Sealant: One part nonacid-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25.
 - 1. Dow Corning Corp., "Dow Corning 790".
 - 2. General Electric Co., "Silproof".
 - 3. Tremco, Inc., "Spectrum 1".
- E. Acid-Curing Silicone Sealant: One part acid-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25.
 - 1. Dow Corning Corp. "Dow Corning 999A".
 - 2. General Electric Co., "Construction 1200."
 - 3. Tremco, Inc., "Proglaze".
 - 4. Rhone-Poulenc, Inc., "Rhodorsil 90".
- F. One-Part Mildew-Resistant Silicone Sealant: Complying with ASTM C920, Type S, Grade NS, Class 25.
 - 1. Dow Corning Corp., "Dow Corning 786".
 - 2. General Electric Co., "Sanitary 1700".
 - 3. Rhone-Poulenc Inc., "Rhodorsil 6 B White".
 - 4. Tremco, Inc., "Proglaze White".
- G. One-Part Nonsag Urethane Sealant: Complying with ASTM C920, Type S, Grade NS, Class 25.
 - 1. Bostik Construction Products Div., "Chem-Calk 900".
 - 2. Pecora Corp., "Dynatrol I".
 - 3. Mameco International, Inc., "Vulkem 116".
 - 4. Tremco, Inc., "Dymonic".

- H. One-Part Pourable Urethane Sealant: Complying with ASTM C920, Type S, Grade P, Class 25.
 - 1. Bostik Construction Products Div., "Chem-Calk 950".
 - 2. Mameco International, Inc., "Vulkem 45".
 - 3. Pecora Corp., "NR-201 Urexpan".

2.3 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: ASTM D1056; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suite application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by the manufacturer.
- B. Beginning of installation means installer accepts existing substrate.

3.2 PREPARATION

- A. Clean and prime joints in accordance with manufacturer's instructions. Prime if recommended by manufacturer.
- B. Remove loose materials and foreign matter that might impair adhesion of sealant.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Perform preparation in accordance with ASTM C804 for solvent release sealants, and C962 for elastomeric sealants.
- E. Protect elements surrounding the work of this Section from damage or disfiguration.

3.3 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Tool joints concave, unless otherwise detailed.

3.4 LEANING AND REPAIRING

A. Clean work under provisions of Section 01 70 00.

B. Clean adjacent soiled surfaces.

C. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.5 PROTECTION OF FINISHED WORK

A. Protect sealants until cured.

3.6 SCHEDULE
LOCATION

TYPE

COLOR

A.	Exterior & interior joints in horizontal surfaces of concrete; between metal and concrete masonry and mortar	One-Part Pourable Urethane	To Match Adjacent Material
B.	Exterior door, entrance & window frames. Exterior & Interior vertical concrete & masonry metal siding metal flashing	One-Part Nonacid One Part Urethane	To Match Adjacent Material
C.	Joints within glazed curtain wall system skylight framing system aluminum entrance system glass & glazing	Acid Curing Silicone	Translucent Black/Bronze
D.	Interior joints in ceramic tile and at plumbing fixtures	Mildew-Resistant Silicone	Translucent
E.	Under thresholds	Butyl	Black
F.	All interior joints not otherwise scheduled	Acrylic solvent	To Match Adjacent Surfaces

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

- A. WORK under this section comprises of furnishing and installing hollow metal frames for doors, windows and hollow metal doors and panels.
- B. Related Documents
 - 1. Drawings and general provisions of contract, including General and Supplementary conditions and Division 1 Specification Sections apply to this Section.
- C. Related Sections:
 - 1. Section 06 20 00 Finish Carpentry.
 - 2. Section 08 71 00 Door Hardware.
 - 3. Section 09 90 00 Painting.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A117.1 – Accessible and Usable Buildings and Facilities.
 - 2. ANSI A250.8/SDI-100 – Recommended Specifications for Standard Steel Doors and Frames.
 - 3. ANSI A250.11 – Recommended Erection Instructions for Steel Frames.
 - 4. ANSI A250.4 and ANSI-A250.5 – Test Procedure and Acceptance Criteria for Physical Endurance, Steel Doors and Frames.
 - 5. ANSI A250.10 – Test Procedure and Acceptance Criteria for Painted Steel Surfaces for Steel Doors and Frames.
- B. ASTM International:
 - 1. ASTM A1008/A1008M – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Allow and High-Strength Low-Allow with Improved Formability.
 - 2. ASTM A568 – General Requirements for Steel, Carbon and High Strength Low Alloy Hot Rolled Strip, and Cold Rolled Sheet.
 - 3. ASTM A924 – General Requirements for Steel Sheet, Metallic Coated by the Hot-Dip Process.
 - 4. ASTM E283 – Standard Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.
- C. National Fire Protection Association:
 - 1. NFPA-80 – Standard for Fire Doors and Windows.
 - 2. NFPA-101 – Life Safety Code.
 - 3. NFPA 105 – Smoke and draft control assemblies.
- D. Steel Door Institute:
 - 1. SDI-107 – Hardware on Steel Doors (Reinforcement Application).
- E. Underwriters Laboratories Inc.:
 - 1. UL 10B – Standard for Fire Tests of Door Assemblies.

2. UL 10B or NFPA 252 at Atmospheric Pressure.
 3. UL 10C – Standard for Positive Pressure Fire Tests of Door Assemblies.
 4. UL 1784 – Air leakage test of door assemblies.
- F. ADA – The Americans with Disabilities Act - Title III - Public Accommodations.
- G. CBC – California Building Code and Local Codes Including Authority Having Jurisdiction.
- H. ITS – Intertek Testing Service [Warnock Hersey].

1.3 SUBMITTALS

- A. Shop Drawings: Indicate door and frame elevations and sections, materials, gages, finishes, fabrication, and erection details, Locations of finish hardware by dimension and locations/details of all openings and louvers. Do not proceed with any fabrication until all details are approved.
- B. Certification of Compliance: Submit any information necessary to indicate compliance to these specifications.
- C. Submit samples if requested by the Architect.
- D. Job Close-out: Provide 1 complete manufacturer’s catalog to the District Locksmith.

1.4 QUALITY ASSURANCE

- A. All hollow metal doors and frames shall be the product of one (1) manufacturer. Exceptions will not be permitted under any circumstances.
- B. Certification of label construction: For components exceeding Underwriters Laboratories, Inc. (UL)- furnish inspection certificate stating that component construction conforms to UL rating requirements only if architect is aware of such a limitation and has allowed the non-labeled unit.
- C. Certification that the Polystyrene Core Swinging Type Fire Doors – Model 707 as manufactured by The Curries Company has been investigated by Underwriters Laboratories and certified for Standard(s) of Safety: UL 10C – Standard for Positive Pressure Fire Tests of Door Assemblies, UL 10B, Standard for Fire Tests of Door Assemblies.
- D. Hollow metal manufacture shall be a SDI member.
- E. The Hollow Metal Manufacturer shall supply doors and frames through a national distribution system as described in 1.06.D herein. Marketing material through a factory direct method will not be acceptable to the District.
 1. Successful distributor shall be located within the Southern California area.
- F. Hollow metal supplier shall be a qualified “local direct distributor” of products to be furnished. The distributor shall have in their regular employment an AHC and/or CDC with a local business address, telephone and fax line, which will be available at reasonable times through-out the project, to consult with the Architect, Contractor and District facilities regarding matters affecting the door and frame openings.
- G. **Contractor will allow in his bid for the replacement of two (2) exterior doors** to be selected at random by the project architect for dismantling and inspection of internal construction and compliance with the specification. Contractor to provide labor and tools for inspection under architect's direction. Exceptions will be Ceco and/or Curries.

- H. Failure of any hollow metal frame or door to meet specified standards shall be grounds to reject the entire shipment of hollow metal doors and frames, including the hollow metal manufacturer. Items shall be replaced at contractor's expense, including two additional doors for dismantling. No extensions of time or additions to the contract will be allowed due to a rejection of material and substitution of the hollow metal manufacturer.
- I. Installer requirement: Firm with a minimum of five (5) years experience in the installation of metal doors and frames similar in the type included in this specification.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver doors and frames cardboard wrapped, crated, palletized or otherwise protected during transit and site storage.
- B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and accepted by the architect. Otherwise remove and replace damaged items.
- C. Store doors and frames at the building site in a dry, secure place.
 - 1. Place units on minimum 4 inch high wood blocking.
 - 2. Avoid non-vented plastic or canvas shelters which could create a humidity chamber.
 - 3. If cardboard wrapper on door becomes wet, remove carton immediately.
 - 4. Provide ¼ inch spaces between stacked doors to promote air circulation.

1.6 SEQUENCING AND SCHEDULING

- A. Deliver all doors and frames to the jobsite in a timely manner so not to delay progress of other trades.
- B. Issue purchase orders to frame, door and hardware suppliers in sufficient time so as not to interfere with normal quoted delivery of materials.

1.7 WARRANTY

- A. Hollow metal doors and frames shall be supplied with a one (1) year warranty against defects in materials and workmanship.
- B. Warranty to commence with substantial completion of the job.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers
 - 1. Curries, (641) 423-1334.
 - 2. Republic Door, (800) 733-3667.
 - 3. Steelcraft, (513) 745-6400.
 - 4. Security Metal Products, (310) 641-6690.
 - 5. Substitutions: Under provisions of Section 01 33 00.
- B. Or Equal, provided products meet the specified performance requirements and are acceptable to the District. Such products are subject to California Public Contracts Code Section 3400.

- C. Performance criteria as specified in 2.03 will be supported by factory cycle and twist test certification document by an independent lab, and will be included in supplier's shop submittals. Exceptions will not be considered.
- D. Any proposed substitution will be reviewed by the District facilities, including the District locksmith. Request will be required ten (10) days before bid. Request will require a complete sample of a product as specified herein, and which will become the permanent property of the District. In addition, the District will be furnished a list of a minimum of twenty (20) local (within a 75 mile radius of the District) institutional end-user customers, with facilities locksmith names and telephone numbers.

2.2 MATERIALS

- A. Steel requirements, all doors and frames to be manufactured of commercial quality, stretcher leveled flatness, cold rolled steel per ASTM-A1008 and A-568 general requirements or galv. to A60 minimum coating weight standard per ASTM-A924 or A653 hot dip galvanized to A60 minimum coating weight standard. Internal reinforcing may be manufactured of hot rolled pickled and oiled steel per ASTM-A1011.
- B. Coating Materials Primer: all doors and frames to be bonderized and finished as standard with manufacturer's baked-on primer conforming to ANSI-A250.10.
 - 1. In addition to factory primer, the paint contractor is responsible for a field applied second primer coating. Primer to be equal to primer coating used by the door and frame Manufacturer.
 - 2. Painting contractor to apply two (2) coats of field applied finish coats per specification requirements.
 - 3. Initial field finish coat to be applied after doors are installed. Final coat to be applied after finish hardware templating and pilot holes have been made.
 - 4. Prior to the application of the final field applied finish coat, all surface installed hardware shall be removed, and then carefully reinstalled after the final coat has been applied and dried. Scratches and mars shall be repaired to the satisfaction of the project Architect and District.
 - 5. Contractor shall protect door and frame surfaces until job completion and final acceptance by the District.
- C. Door Core
 - 1. Polystyrene core. All doors to have:
 - a. Non-labeled or labeled doors: polystyrene slab [minimum .24 U factor], self extinguishing, non-toxic in case of fire.
 - b. Permanently bonded to the inside of each face sheet providing rigidity, insulating and sound deadening properties to the door.
 - c. Refer to 2.03 for additional specification
 - 2. Steel ribbed and honeycomb doors are not acceptable, and will not be considered by the District.
 - 3. Temperature rise rated doors should be provided for stairwell enclosures, which indicate "Temperature rise 30 minutes - 450 degrees F maximum or 250 degrees F maximum" as required by the local building code.
- D. Glass lite frames in doors fabricated of not less than 18GA. galvanized steel with attachment screws allowed only on the non-secure side, screws not visible when viewing door lite frame face.
- E. Electric Through-Wire [HMD]
 - 1. Provide all hollow metal doors receiving electrified hardware with electrical through-door wiring harness and concealed plug connectors on each end to accommodate up to twelve wires.

2. Coordinate electrical connectors on each end of the wiring harness to plug directly into the electrified hardware and the electric hinge.
- F. Electric Through-Wire [HMF]
1. Provide all hollow metal frames receiving electrified hardware with electrical wiring harness and concealed plug connectors on one end to accommodate up to twelve wires.
 2. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the electric hinge.

2.3 FABRICATION

A. General

1. Fabricate all doors and frames in accordance with ANSI A250.8-1998/SDI-100 except where more stringent requirements are specified.
2. As detailed on plans, fabricated "welded" frame units to be delivered to job site as single units. Transoms, sidelights, and window walls which are "oversize" for transportation and installation, shall be furnished with field splices to be field assembled by the general contractor.
3. Supply only doors and frames manufactured by the acceptable manufacturer listed in this specification.
4. Doors to be 707 Series as manufactured by the Curries Co, Mason City, IA. 727 Series at Temperature rise rated doors, which indicate "Temperature rise 30 Min.-450F degrees maximum or 250F degrees maximum" as required by local building code.
5. Prepare doors to receive door hardware per approved schedule, including internal reinforcing. Through-Bolts (SNB) are not permitted unless specifically requested by the Architect and/or District. Do not include unnecessary cutouts in door faces not required by hardware template.

B. Door Construction

1. Classification: SDI Level III - Model 2 (16GA. doors).
2. Face sheets formed of cold rolled steel.
3. Exterior doors to be galvanized to A60 minimum weight standard.
 - a. Perimeter fence hollow metal door gates/frames to be galvanized to G90 and fabricated per architect's drawings/elevations. Refer to dwgs/elevs.
4. Seamless construction [Equal to Curries 707T] by **continuous wire weld** of both edges full height of door, and to be done at the factory.
5. Lite and louver door cutouts: Furnish perimeter channel reinforcement seal watertight by supplier.
6. Lock edges beveled 1/8 inch in 2 inches.
7. Door lock edge reinforcing shall be **one-piece, full height 14GA. Channel**. Door hinge edge reinforcing shall be **one-piece, full height 12GA. Channel** formed and tapped for hinges or as required per listed hardware.
8. Both hinge and lock channels to be welded to each face sheet of the door.
9. Top and bottom channels:
 - a. Not less than 16GA. - flush or inverted.
 - b. Welded to the face sheet.
 - c. Close tops of exterior doors flush by the addition of 16GA. Galvanized. Steel channel fillers. Channel filler to be sealed watertight.
10. Astragals: To be flat security type or 'Z' as called for in drawings or specifications.
11. All doors to conform to A.N.S.I.-A 250.4 Test Procedure and Acceptance Criteria for Physical Endurance. Door size cycle tested to be 4070 to minimum Level A performance for 18 or 16GA. door. **Doors will have been subjected to an additional one (1) million cycle and twist tests with a combined two (2) million cycles and 46 twist tests. Testing to be accomplished by an independent lab. Certification of these criteria to be submitted with approval drawings by the supplier. Exceptions will not be considered.**

12. Transom Panels: To be constructed similar to doors.
13. Where indicated, provide insert type louvers in bottom of doors. Louvers to be not less than 18 GA. prime coated steel.
14. Minimum HG/FG stiles shall be six (6) inches wide. Top rail shall be a minimum eight (8) inches.

C. Door and Window Frame Construction

1. Frames shall comply with ANSI/SDI A250.5 Level A, one million cycle swing test performance for a 4070 door frame.
2. All frames to be formed from cold rolled steel. Furnish 14GA. exterior door and window frames and 16GA. interior door and window frames. Both exterior door and window frames to be galvanized to A60 minimum weight standard.
 - a. Where specified, perimeter fence hollow metal door gates/frames to be galvanized to G90 and fabricated per architect's drawings/elevations.
3. All frames are to be **Full Profile welded**, ground smooth, and re-primed at the welded area.
4. Window frame glass stops shall be minimum 18GA. steel and 5/8" in height. Exterior stops & countersunk flat-head attachment screws to be galvanized.
5. Provide temporary shipping bars to help protect from damage during transit and handling.
6. Temporary shipping bars to be removed before setting frames.
7. All welds on frames, transoms and sidelites to be flush with neatly mitered or butted material cuts.
8. Water Penetration: Borrowed lite assemblies, transom, sidelite and combination transom sidelite frames are not factory sealed to prevent water penetration. In situations where water penetration is a concern, contractor must seal with quality long lasting sealant, all joints that are exposed to the elements after the frame assembly is installed. **Whenever possible, it is recommended that glass and glazing be installed on the exterior rabbet of the frame assembly. This will help act as a deterrent to water penetration. The member companies of the hollow metal industry cannot control the workmanship associated with the frame installation; therefore, it is the responsibility of the installer to assure all steps are taken to prevent water penetration.**

D. Frame Anchors

1. Provide sufficient anchorage to attach to wall in accordance with ANSI/SDI A250.5-'94 Test Compliance Level 'A' of one million cycles, or anchorage as detailed on plans to specific wall conditions.
2. Wall anchor for frame attachment to masonry construction: Masonry anchors, adjustable, flat, corrugated or perforated 'T' shaped anchors with leg not less than 2 inches wide by 10 inches long or masonry "wire" type not less than 3/16 inch dia.
3. All frame jamb anchors to be provided: one each jamb per 30 inches of frame height or fraction thereof. Furnish anchors at headers exceeding 48 inches.
4. Floor anchors - angle clip type:
 - a. Minimum 16 GA.
 - b. To receive 2 fasteners per jamb.
 - c. Welded to the bottom of each jamb.
5. In place masonry or concrete:
 - a. 3/8 inch countersunk flat head stove bolt and expansion shields.
 - b. Spaced 6 inches from top and bottom of frame and at 26 inches on center maximum between.
 - c. Weld pipe spacers or other type of spacers per Manufacturer's standard design in back of frame soffit to protect frame profile during tightening of bolts and anchors.
6. Head struts: for frames not anchored to masonry or concrete construction provide ceiling struts spot welded to jambs each side extending to building structure where called for on schedule.

E. Hardware Preparation

1. Reinforcements: reinforce components for hardware installation in accord with SDI -107 and ANSI-A115. Provide minimum gauge hardware reinforcing for mortise or surface applied hardware as follows:
 - a. Hinges - 10 GA. or equivalent number of threads on doors; 7 GA. on frames for mortise butt hinge type; 12 GA. full length on frames for continuous hinge.
 - b. Locks - 12 GA. or equivalent number of threads.
 - c. Panic Devices - 12 GA.
 - d. Surface Closers - 12 GA.
 - e. Hold Open Device - 12 GA.
2. Field drilling and/or tapping for surface applied hardware is installation contractor's responsibility. Refer to SDI 107 as a recommended guide for proper reinforcement and installation.
 - a. Lock reinforcement shall be 16 GA. channel type typical of Curries G3 [86] four sided compression resistant design.
 - b. Panic reinforcement to be 14 GA. channel type.
 - c. Closer reinforcement to be 12 GA. channel type.
 - d. Hinge and lock reinforcing on doors to be channel type, continuous from top to bottom of door welded to face sheets.
3. Punch single leaf frames to receive three (3) silencers. Double leaf frames to receive one silencer per leaf at head.
4. Factory prepared hardware locations to be in accord with "Recommended locations for Builders' Hardware for Standard Steel Doors and Frames", as adopted by the Steel Door Institute.
5. Grout solid all frames in masonry or concrete walls. Provide steel plaster guards or mortar boxes, welded to frame, at back of hardware cutouts where installed in concrete, masonry or plaster openings. Protect inside throat of each frame in grout filled wall conditions or where antifreeze additives are used in fill, with a waterproof undercoating material minimum 1/8" thick, field applied by installer.

F. Excess Material

1. Contractor to deliver any unused doors and frames to the District facilities.

2.4 PROTECTIVE COATINGS

- A. Bituminous Coating: Fibered asphalt emulsion to be applied to the interior of all hollow metal frames set in concrete block walls.
- B. Primer: Zinc chromate type.

PART 3 EXECUTION

3.1 SETTING FRAMES

- A. Set all frames in accord with SDI 122 "Installation and Trouble-Shooting Guide for Standard Steel Doors and Frames" or "The Installation of Commercial Steel Doors and Steel Frames" and "Builders Hardware" as published by the DHI are recommended guidelines.
- B. Set welded frames in position prior to beginning partition work. Brace frames until permanent anchors are set.
- C. Set anchors for frames as work progresses. Install anchors at hinge and strike levels.

- D. Use temporary setting spreaders at all locations. Use intermediate spreaders to assure proper door clearances and header braces for grouted frames.
- E. Install frames in prepared openings in concrete and masonry walls using countersunk bolts and expansion anchors.
- F. Install all fire rated frames in accord with requirements of N.F.P.A.80.
- G. Where frames require ceiling struts or other structural overhead bracing, they shall be anchored securely to structure above, as required.
- H. Frames shall be filled solid with Portland cement grout where shown or required by class of opening in masonry or concrete walls. Provide steel plaster guards or mortar boxes, welded to frame, at back of hardware cutouts where installed in concrete, masonry or plaster openings. Protect inside throat of each frame in grout filled wall conditions or where antifreeze additives are used in fill, with a waterproof undercoating type material minimum 1-2 mils thick, field applied by installer.

3.2 DOOR INSTALLATION

- A. Install hollow metal doors in frames using hardware specified in Section 08 71 00 Door Hardware. Doors are to be expertly hung and shall fit snug against all stops. Doors shall fit accurately and hang free from hinge bind with a uniform clearance of 1/8 inch at head and jambs. After hanging, make all adjustments and then remove respective hardware for finish painting. Reinstall hardware after finish painting.
- B. Maximum clearances at edge of doors:
 - 1. Between door and frame at head and jambs: 1/8 inch.
 - 2. At meeting edges pairs of doors and at mullions: 1/8 inch.
 - 3. At transom panels, without transom bars: 1/8 inch.
 - 4. At sills without thresholds: 5/8 inch max above finish floor.
 - 5. At sills with thresholds: 1/8 inch above threshold.
- C. Hardware Installation: to be installed securely without marking or defacing hardware or Finish work. Protect finish hardware with suitable protective covering until completion of building. Leave all hardware in perfect working order. Clean and polish.

3.3 ADJUSTMENT AND CLEANING

- A. Remove dirt and excess sealant, mortar or glazing compounds from exposed surfaces.
- B. Adjust for smooth operation as required. Install shims as required to allow for proper closing.
- C. Fill all dents, holes, etc. with metal filler and sand smooth and flush with adjacent surfaces - reprime/paint to match finish.

END OF SECTION

SECTION 08 11 17

PREFINISHED STEEL DOOR FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-rated and fire rated, shop pre-finished, site assembled steel frames.

1.2 RELATED SECTIONS

- A. Section 01 30 00 – Administrative requirements.
- B. Section 01 70 00 – Execution and Closeout Requirements.
- C. Section 06 20 00 – Finish Carpentry.
- D. Section 08 14 16 – Flush Wood Doors.
- E. Section 08 71 00 – Door Hardware.

1.3 REFERENCES

- A. ASTM International:
 - 1. ASTM A1008M – Standard for cold rolled material.
 - 2. ASTM D2197 - Standard Test Method for Adhesion of Organic Coatings by Scrape Adhesion.
 - 3. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
 - 4. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 - 5. ASTM D3361 - Standard Practice for Unfiltered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
 - 6. ASTM E152 - Methods of Fire Tests of Door Assemblies.
 - 7. ASTM B117 – Standard test for salt spray testing.
- B. National Fire Protection Association:
 - 1. NFPA-80 – Standard for Fire Doors and Windows.
 - 2. NFPA 252 – 1995 Fire Tests for Door Assemblies.
- C. ITS (WH) - Fire Tests of Door Assemblies.
- D. Underwriters Laboratories Inc.:
 - 1. UL 10B – Fire Tests of Door Assemblies.
 - 2. UL 10C – Positive Pressure Fire Tests of Door Assemblies.
- E. CBC – California Building Code and Local Codes Including Authority Having Jurisdiction.

1.4 SUBMITTALS

- A. Section 01 30 00: Submission procedures.
- B. Product Data: Indicate frame configuration and finishes.

- C. Shop Drawings: Indicate frame elevations, reinforcement required, and spacing, location of embosses for hardware, and finish.
- D. Samples: Submit two standard frame samples, illustrating factory finished frame colors and surface texture.
- E. Manufacturer's Installation Instructions: Indicate special installation instructions.
- F. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Installers: Individuals that are "Certified Prefinished Frame Installers" for the installation of site assembled door frames.

1.6 REGULATORY REQUIREMENTS

- A. Conform to 2022 California Building Code for fire rated frames.
- B. Fire Rated Frame Construction: Conform to ASTM E152.
- C. Installed Frame Assembly: Conform to NFPA 80 for fire rated class same as fire door as indicated in Schedule and on Drawings.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Accept frames on site in manufacturer's box packaging with identification labels intact. Inspect for damage.
- B. Do not open individual boxes until installation is to begin.

1.8 PROJECT CONDITIONS

- A. Section 01 30 00: Coordination and meetings.
- B. Verify actual measurements/openings by field measurement prior to fabrication.
- C. Coordinate the work with frame opening construction, door and hardware installation.

PART 2 PRODUCTS

2.1 FRAME MANUFACTURERS

- A. Timely Industries, A Division of SDS Industries, Inc., 10241 Norris Avenue, Pacoima, CA, 91331-2292; 800-247-6242.
- B. Frames: Provide all frames for project from same manufacturer.
- C. Substitutions: Refer to Section 01 60 00.

2.2 FRAMES

- A. Frame Material: Cold rolled steel for interior frames. Cold rolled steel, electro-galvanized for exterior frames.

- B. Frame Throat Opening: to suit finished wall thickness.
- C. Frame Profile: Non-rated and fire rated:
 - 1. "C" Series, 1.2 mm (18 gage) thick.
- D. Frame Casings:
 - 1. Material: Steel casings with corner alignment clips.
 - 2. Standard Steel Type: Model TA-8 with 1/4 inch reveal, on steel frames. Fit factory assembled units with MiterGard corner alignment clips.

2.3 ACCESSORIES

- A. Reinforcement Bracket for Closer: Multi-purpose application, Model TA-25.
- B. Reinforcement Brackets for Rim Exit Device: Model TA-12.
- C. Reinforcement Brackets for Door Guards: Model TA-10.
- D. Weatherstripping: Specified in Section 08 71 00.
- E. Silencers: Specified in Section 08 71 00.
- F. Fasteners:
 - 1. Interior Frames: Drywall type.
 - 2. Exterior Frames: Drywall type with corrosion resistant coating.

2.4 FABRICATION

- A. Casing Clips: Fabricate frames with factory applied heated treated clips.
- B. Mullions for Double Doors: As provided by Section 08 71 00.
- C. Transom Bars: Fixed type same profiles as jamb and head.
- D. Fabricate frames with hinge reinforcement plates secured in place.
- E. Attach fire rated label to each fire-rated frame.
- F. Silencers: As provided by Section 08 71 00.

2.5 FINISH

- A. Frame Units: Prefinished with factory applied impact resistant, polyester baked enamel finish.
- B. Casing: Prefinished steel with factory applied impact resistant, polyester baked enamel finish.
- C. Primer: Primer Electro Galvanized.
- D. Colors: To be selected from full range of available colors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00: Verify acceptability of existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

- A. Install frames in accordance with manufacturer's requirements.
- B. Install Prefinished frames near end of the project after completing wall painting and wall coverings.
- C. Install frames using Certified Installers.
- D. Coordinate installation of glass and glazing in glazed units.
- E. Coordinate installation of frames with installation of hardware specified in Section 08 71 00 and doors in Section 08 14 16.
- F. Touch-up blemishes on finished frames.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wood Doors fire rated and non-rated.
- B. Door louvers.

1.2 RELATED SECTIONS

- A. Section 08 11 13 - Hollow Metal Doors and Frames.
- B. Section 08 71 00 - Door Hardware.

1.3 REFERENCES

- A. NWWDA I.S.1 - Industry Standard For Wood Flush Doors (Includes Standards I.S.1.1 through I.S.1.7).
- B. UL 10B - Fire Tests of Door Assemblies.
- C. Woodwork Institute - Manual of Millwork.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of W.I. Manual of Millwork, Section 20, Custom/Premium Grade except where otherwise indicated.
- B. Construction: Conform to UL 10B.
- C. Installed Doors : Conform to NFPA 80 for fire rated class indicated.
- D. Issue a W.I. Certified Compliance Certificate prior to delivery of doors certifying that doors meet all requirements of W.I. Grade or Grades specified.

1.5 REGULATORY REQUIREMENTS

- A. Conform to 2022 California Building Code fire rated doors.

1.6 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00. Shop drawings shall bear the "W.I. Certified Compliance Label" on the first page of each set.
- B. Indicate door elevations, stile and rail reinforcement, internal blocking for hardware attachment, and cutouts for glazing and louvers.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit two samples 12 x 12 inch in size illustrating each species.

1.7 DELIVERY, STORAGE AND PROTECTION

- A. Protect products under provisions of Section 01 70 00.
- B. Package, deliver, and store doors in accordance with W.I. requirements as set forth in Technical Bulletin 419-R.

1.8 WARRANTY

- A. Provide five year manufacturer's warranty under provisions of Section 01 70 00.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers - Flush Faced Doors
 1. Cal Wood, Santa Rosa, CA 95402 (800) 582-7333.
 2. Eggers Industries, Rancho California, CA 92390 (714) 676-5351.
 3. Glen Mar Door Mfg. Co., Phoenix, AZ 85005, (800) 528-6339.
 4. Wyerhauser Company, Los Angeles, CA 90007 (213) 748-5451.
 5. Substitutions: Under provisions of Section 01 60 00.

2.2 DOOR CONSTRUCTION

- A. Solid Non-Rated Core: Solid wood block, framed block glued, or solid particleboard.
- B. Solid, Special Function Core: Labeled fire performance type.
- C. Flush Interior Door Veneer: White Oak species; sliced with pair matched grain, for transparent finish. Medium density overlay plywood face veneer for paint finish.
- D. Glazing Frames: 18 gauge steel with mitered and welded corners, ground smooth. Complete with binder posts through bolts. Finish with baked-on prime coat for painting.

2.3 ADHESIVES

- A. Interior Doors: W.I. Type I.

2.4 FABRICATION

- A. Fabricate non-rated wood doors to requirements of W.I. "Manual of Millwork", Section 20, latest edition, in the W.I. Grade or Grades specified.
- B. Fabricate fire rated doors per manufacturer's standard construction, and labeling agency requirements. Face veneer shall conform to W.I. Grade and species specified.
- C. Pre-machine doors for finish hardware.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install doors in accordance with W.I. "Manual of Millwork" Section 26 and W.I. Technical Bulletin 420-R. Conform to W.I. requirements for fit tolerances. Coordinate installation of glass and glazing. Install door louvers as specified. Adjust doors for smooth and balanced movements.
- B. Contractor shall provide to architect a W.I. Certified Compliance Certificate for installation at the completion of project installation.
- C. Fire doors and frames shall be installed in accordance with their listing, NFPA #80 and the manufacturer's instructions.

END OF SECTION

SECTION 08 31 13

ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-rated access doors and frames.

1.2 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Include sizes, types, finishes, scheduled locations, and details of adjoining work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers
 1. Bar-Co., Enterprise, AL 36331 (205) 347-9451.
 2. J.L. Industries, Los Angeles, CA 90001 (415) 489-4441.
 3. Milcor Incorporated, Lima, OH 45804 (419) 227-6899.
 4. Substitutions: Under provisions of Section 01 60 00.

2.2 ACCESS UNITS

- A. Non Rated Units: Equivalent to Milcor Style M.

2.3 FABRICATION

- A. Non-Rated Units: Fabricate frames of 16 gage steel and door panels of 20-gage steel.
- B. Units shall be 24" x 24", unless noted otherwise on plans.
- C. Weld, fill, and grind joints to assure flush and square unit.
- D. Hardware: Continuous type steel hinges with stainless steel pin, cylinder lock with latch, two keys for each unit.
- E. Anchors: Provide masonry anchors where required for wall construction.

2.4 FINISH

- A. Prime coat units with baked on electrostatic primer.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify rough openings for door and frame are correctly sized and located.

- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install frame plumb and level in wall and ceiling openings.
- B. Position to provide convenient access to concealed work requiring access.
- C. Secure rigidly in place in accordance with manufacturer's instructions.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Door hardware, including electric hardware.
2. Third-party inspection report for fire-rated door assemblies.
3. Padlocks.
4. Cylinders for doors fabricated with locking hardware.
5. Key management software.

B. Related Divisions:

1. Division 06 – door hardware installation
2. Division 07 – sealant at exterior thresholds
3. Division 08 – metal doors and frames, interior aluminum frames, wood doors, integrated security systems, specialty doors, storefront and glazed curtainwall systems.
4. Division 21 – fire and life safety systems

D. Omissions: Hardware for the following is specified or indicated elsewhere.

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories, including grab bars.
5. Installation.
6. Rough hardware.
7. Conduit, junction boxes & wiring.
8. Folding partitions, except cylinders where detailed.
9. Sliding aluminum doors, except cylinders where detailed.
10. Access doors and panels, except cylinders where detailed.
11. Corner Guards.
12. Welded steel gates and supports.

1.2 REFERENCES:

A. Use date of standard in effect as of Bid date.

1. American National Standards Institute
 - a) ANSI 156.18 – Materials and Finishes.
2. BHMA – Builders Hardware Manufacturers Association
3. 2022 California Building Code
 - a) Chapter 11B – Accessibility To Public Buildings, Public Accommodations, Commercial Buildings and Public Housing
4. DHI – Door and Hardware Institute
5. NFPA – National Fire Protection Association
 - a) NFPA 80 2019 Edition – Standard for Fire Doors and Other Opening Protectives.
 - b) NFPA 105 – Smoke and Draft Control Door Assemblies
 - c) NFPA 252 – Fire Tests of Door Assemblies

6. UL – Underwriters Laboratories
 - a) UL10C – Positive Pressure Fire Tests of Door Assemblies.
 - b) UL 305 – Panic Hardware
7. WHI – Warnock Hersey Incorporated State of California Building Code
8. Local applicable codes
9. SDI – Steel Door Institute
10. WI – Woodwork Institute
11. AWI – Architectural Woodwork Institute
12. NAAMM – National Association of Architectural Metal Manufacturers

B. Abbreviations

1. Manufacturers: see table at 2.1.A of this section
2. Finishes: see 2.7 of this section.

1.3 SUBMITTALS & SUBSTITUTIONS

- A. **SUBMITTALS:** Submit six copies of schedule per D. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Minimum 10pt font size. Include following information:
1. Type, style, function, size, quantity and finish of hardware items.
 2. Use BHMA Finish codes per ANSI A156.18.
 3. Name, part number and manufacturer of each item.
 4. Fastenings and other pertinent information.
 5. Location of hardware set coordinated with floor plans and door schedule.
 6. Explanation of abbreviations, symbols, and codes contained in schedule.
 7. Mounting locations for hardware.
 8. Door and frame sizes, materials and degrees of swing.
 9. List of manufacturers used and their nearest representative with address and phone number.
 10. Catalog cuts.
 11. Point-to-point wiring diagrams.
 12. Manufacturer’s technical data and installation instructions for electronic hardware.
- B. Bid and submit manufacturer’s updated/improved item if scheduled item is discontinued.
- C. Deviations: Highlight, encircle or otherwise identify deviations from “Schedule of Finish Hardware” on submittal with notations clearly designating those portions as deviating from this section.
- D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.
- E. Substitutions per Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.
- F. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.

- G. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, riser and point-to-point wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

1.4 QUALITY ASSURANCE:

- A. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
- B. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- C. Fire-Rated Openings: NFPA 80 compliant. Hardware UL10C (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.
- D. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions and code requirements.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Delivery: coordinate delivery to appropriate locations (shop or field).
 - 1. Permanent keys and cores: secured delivery direct to Owner's representative.
- B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
- C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.6 PROJECT CONDITIONS AND COORDINATION:

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.
- B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:
 - 1. Location of embedded and attached items to concrete.
 - 2. Location of wall-mounted hardware, including wall stops.
 - 3. Location of finish floor materials and floor-mounted hardware.

4. At masonry construction, coordinate with the anchoring and hollow metal supplier prior to frame installation by placing a strip of insulation, wood, or foam, on the back of the hollow metal frame behind the rabbet section for continuous hinges, as well as at rim panic hardware strike locations, silencers, coordinators, and door closer arm locations. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.
 5. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
 6. Coordinate: low-voltage power supply locations.
 7. Coordinate: flush top rails of doors at outswinging exteriors, and throughout where adhesive-mounted seals occur.
 8. Manufacturers' templates to door and frame fabricators.
- C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.
- D. Environmental considerations: segregate unused recyclable paper and paper product packaging, uninstalled metals, and plastics, and have these sent to a recycling center.

1.7 WARRANTY:

- A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties.
- B. Include factory order numbers with close-out documents to validate warranty information, required for Owner in making future warranty claims:
- C. Minimum warranties:
- | | | |
|----|------------------------------------|---|
| 1. | Locksets: | Three years |
| 2. | Extra Heavy Duty Cylindrical Lock: | Seven Years |
| 3. | Exit Devices: | Three years mechanical
One year electrical |
| 4. | Closers: | Thirty years mechanical
Two years electrical |
| 5. | Hinges: | One year |
| 6. | Other Hardware | Two years |

1.8 COMMISSIONING:

- A. Conduct these tests prior to request for certificate of substantial completion:
1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.

1.9 REGULATORY REQUIREMENTS:

- A. Doors/doorways as part of an accessible route shall comply with CBC Section 11B-404.

- B. Locate latching hardware between 34 inches to 44 inches above the finished floor, per 2022 California Building Code, Section 11B-404.2.7.
 - 1. Panic hardware: locate between 36 inches to 44 inches above the finished floor.
- C. Handles, pull, latches, locks, other operable parts:
 - 1. Readily openable from egress side with one hand and without tight grasping, tight pinching, or twisting of the wrist to operate. 2022 California Building Code Section 11B-309.4.
 - 2. Force required to activate the operable parts: 5.0 pounds maximum, per 2022 California Building Code Section 11B-309.4.
- D. Adjust doors to open with not more than 5.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors. As allowed per 2022 California Building Code Section 11B-404.2.9, DSA may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15-pounds. These forces do not apply to the force required to retract latchbolts or disengage other devices that hold the door in a closed position.
- E. Adjust door closer sweep periods so that from an open position of 90 degrees, the door will take at least 5 seconds to move to a point 12 degrees from the latch, measured to the landing side of the door, per 2022 California Building Code Section 11B-404.2.8.
 - 1. Spring hinges: adjust for 1.5 seconds minimum for 70 degrees to fully-closed.
- F. Smooth surfaces at bottom 10 inches of push sides of doors, facilitating push-open with wheelchair footrests, per 2022 California Building Code Section 11B-404.2.10.
 - 1. Applied kickplates and armor plates: bevel the left and right edges; free of sharp or abrasive edges.
 - 2. Tempered glass doors without stiles: bottom rail may be less than 10 inches if top leading edge is tapered 60 degrees minimum.
- G. Door opening clear width no less than 32 inches, measured from face of frame stop, or edge of inactive leaf of pair of doors, to door face with door opened to 90 degrees. Hardware projection not a factor in clear width if located above 30 inches and below 80 inches, and the hardware projects no more than 4 inches. 2022 California Building Code Section 11B-404.2.3.
 - 1. Exception: doors not requiring full passage through the opening, that is, to spaces less than 24 inches in depth, may have the clear opening width reduced to 20 inches. Example: shallow closets.
 - 2. Door closers and overhead stops: not less than 78 inches above the finished floor or ground, per 2022 California Building Code 11B-307.4.
- H. Thresholds: floor or landing no more than 0.50 inches below the top of the threshold of the doorway, per 2022 California Building Code Section 11B-404.2.5. Vertical rise no more than 0.25 inches, change in level between 0.25 inches and 0.50 inches: beveled to slope no greater than 1:2 (50 percent slope). 2022 California Building Code Section 11B-303.2 & ~.3.
- I. Floor stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present a tripping hazard..

- J. Pairs of doors with independently-activated hardware both leaves: limit swing of right-hand or right-hand-reverse leaf to 90 degrees to protect persons reading wall-mounted tactile signage, per 2022 California Building Code Section 11B-703.4.2.
- K. Door and door hardware encroachment: when door is swung fully-open into means-of-egress path, the door may not encroach/project more than 7 inches into the required exit width, with the exception of door release hardware such as lockset levers or panic hardware. These hardware items must be located no less than 34-inches and no more than 48-inches above the floor/ground. 2022 California Building Code, Section 1005.7.1.
- L. New buildings that are included in public schools (kindergarten through 12th grade) state funded projects and receiving state funding pursuant to Leroy F. Green, School Facilities Act of 1998, California Education Code Sections 17070.10 through 17079, and that are submitted to the Division of the State Architect for plan review after July 1, 2011 in accordance with the Education Code 17075.50, shall include locks that allow doors to classrooms and any room with an occupancy of five or more persons to be locked from the inside. The locks shall conform to the specification and requirements found in Section 1010.2. 2022 California Building Code Section 1010.2.8

Exceptions:

- 1. Doors that are locked from the outside at all times such as, but not limited to, janitor's closet, electrical room, storage room, boiler room, elevator equipment room and pupil restroom.
- 2. Reconstruction projects that utilize original plans in accordance with California Administrative Code, Section 4-314.
- 3. Existing relocatable buildings that are relocated within same site in accordance with California Administrative Code, Section 4-314.
- 4. Hardware (including panic hardware) shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met: (Such conditions must be clearly demonstrated and indicated in the specifications)
 - Such hardware has a dogging feature.
 - It is dogged during the time the facility is open.
 - _Such dogging operation is performed only by employees as their job function (non-public use).

PART 2 PRODUCTS

2.1 MANUFACTURERS:

- A. Listed acceptable alternate manufacturers: these will be considered; submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE ALTERNATE:
Hinges	(IVE) Ives	Bommer
Continuous Hinges	(IVE) Ives	Select
Pivots	(IVE) Ives	Rixson
Floor Closers	(RIX) Rixson	Dorma
Key System	(SCH) Schlage	Owner standard
Mechanical Locks	(SCH) Schlage	Owner standard
Electronic Locks	(SCE) Schlage Electronics	Owner standard
Exit Devices	(VON) Von Duprin	Owner standard
Closers	(LCN) LCN	Owner standard
Auto Flush Bolts	(IVE) Ives	DCI
Coordinators	(IVE) Ives	DCI
Silencers	(IVE) Ives	Rockwood, Trimco
Push & Pull Plates	(IVE) Ives	Rockwood, Trimco
Kickplates	(IVE) Ives	Rockwood, Trimco
Stops & Holders	(IVE) Ives	Rockwood, Trimco
Overhead Stops	(GLY) Glynn-Johnson	ABH
Thresholds	(ZER) Zero	NGP, Pemko
Seals & Bottoms	(ZER) Zero	NGP, Pemko
Key Cabinets	(LUN) Lund	TelKee
Aluminum Door Locks	(ADA) Adams Rite	None

2.2 HINGING METHODS:

- A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

- B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.
- C. Conventional Hinges: Steel or stainless steel pins and approved bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
 - 1. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.
 - 2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

- A. Mortise Locksets and Latchsets: as scheduled.
 - 1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
 - 2. Universal lock case – 10 functions in one case.
 - 3. Floating mounting tabs automatically adjusts to fit a beveled door edge.
 - 4. Latchbolts: 0.75 inch throw stainless steel anti-friction type.
 - 5. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
 - a) Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
 - b) Inside lever applied by screwless shank mounting – no exposed trim mount screws.
 - c) Levers rotate up or down for ease of use.
 - d) Vandalgard locks: locked lever freely rotates down while remaining securely locked. This feature prevents damage to internal lock components when subjected to excessive force.
 - 6. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
 - 7. Turnpieces: accessible offset turn-lever design not requiring pinching or twisting motions to operate.
 - 8. Deadbolts: stainless steel 1-inch throw.
 - 9. Electric operation: Manufacturer-installed continuous duty solenoid.
 - 10. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
 - 11. Scheduled Lock Series and Design: Schlage L series, 06A design.
 - 12. Certifications:
 - a) ANSI A156.13, Grade 1 Operational, Grade 1 Security.
 - b) ANSI/ASTM F476-84 Grade 31 UL Listed.
 - 13. Accessibility: Require not more than 5 lb to retract the latchbolt or deadbolt, or both, per CBC 2022 11B-404.2.7 and 11B-309.4.

2.4 EXIT DEVICES / PANIC HARDWARE

- A. General features:
 - 1. Independent lab-tested 1,000,000 cycles.

2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
 3. Deadlocking latchbolts, 0.75 inch projection.
 4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
 5. No exposed screws to show through glass doors.
 6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
 7. Releasable in normal operation with 15-pound maximum operating force per UBC Standard 10-4, and with 32-pound maximum pressure under 250-pound load to the door.
 8. Exit/panic hardware to be in compliance with California State Fire Marshall standard 12-10-3, section 12-10-032.
 - a) The cross bar shall extend across not less than one-half the width of the door/gate..
 - b) The ends of the cross-bar shall be curved, guarded or otherwise designed to prevent catching on the clothing of persons during egress.
- B. Accessibility: Require not more than 5 lb to retract the latchbolt, per CBC 2022 11B-404.2.7 and 11B-309.4.
- a) Mechanical method: Von Duprin “AX-“ feature, where touchpad directly retracts the latchbolt with 5 lb or less of force. Provide testing lab certification confirming that the mechanical device is independent third-party tested to meet this 5 lb requirement.
 - b) Electrical method: Von Duprin’s “RX-QEL-“, where lightly pressing the touchpad with 5 lb or less of force closes an electric switch, activating quiet electric latch retraction.
- C. Specific features:
1. Non-Fire Rated Devices: cylinder dogging.
- D. Lever Trim: breakaway type, forged brass or bronze escutcheon min. 0.130 inch thickness, compression spring drive, match lockset lever design.
- E. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.
- F. Fire-Labeled Devices: UL label indicating “Fire Exit Hardware”. Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
- G. Impact recessed devices: 1.25 inch projection when push-pad is depressed. Sloped metal end caps to deflect carts, etc. No pinch points to catch skin between touchbar and door.
- H. Delayed Egress Devices: Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input, external inhibit input plus fire alarm input. NFPA 101 “Special Locking Arrangement” compliant.
- I. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
- J. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key. Furnish storage brackets for securely stowing the mullion away from the door when removed.

K. Accepted substitutions: None

2.6 CLOSERS

A. Surface Closers:

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Adjust doors to open with not more than 5.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors. As allowed per 2022 California Building Code Section 11B-404.2.9, DSA may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15-pounds. These forces do not apply to the force required to retract latchbolts or disengage other devices that hold the door in a closed position.
 - a) Exception: exterior doors' pressure-to-open may be increased to 8.5-pounds if: at a single location, and one of a bank of eight leaves or fraction of eight, and one leaf of this bank is fitted with a low- or high-energy operator.
7. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
8. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
9. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
10. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
11. Non-flaming fluid, will not fuel door or floor covering fires.
12. Pressure Relief Valves (PRV) not permitted.
13. Accepted substitutions: None

2.7 OTHER HARDWARE

- A. Automatic Flush Bolts: Low operating force design.
- B. Overhead Stops: Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- C. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
- D. Door Stops: Provide stops to protect walls, casework or other hardware.
 1. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.

2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
- E. Thresholds: As scheduled and per details. Comply with CBC 2022 11B-404.2.5. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
1. Saddle thresholds: 0.125 inches minimum thickness.
 2. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Minimum 0.25 inch diameter fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors. National Guard Products' "COMBO" or Pemko Manufacturing's "FHSL".
 3. Fire-rated openings, 90-minutes or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, include a 0.25in high 5in wide saddle in the bid, and request direction from Architect.
 4. Fire-rated openings, 3-hour duration: Thresholds, where scheduled, to extend full jamb depth.
 5. Acoustic openings: Set units in full bed of Division-7-compliant, leave no air space between threshold and substrate.
 6. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
 7. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
- F. Through-bolts: Do not use. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.
1. Exception: surface-mounted overhead stops, holders, and friction stays.
- G. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Leave no unfilled/uncovered pre-punched silencer holes. Intent: door bears against silencers, seals make minimal contact with minimal compression – only enough to effect a seal.

2.8 FINISH:

- A. Generally: BHMA 626 Satin Chromium.
 1. Areas using BHMA 626: furnish push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise scheduled.
- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.

2.9 KEYING REQUIREMENTS:

- A. Key System: (Verify with owner) Schlage Everest patented keyway, small format interchangeable core. Key blanks available only from factory-direct sources, not available from after-market key blank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner to determine system keyway(s) and structure and keybow styles, furnish Owner's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the Owner.
 - 1. Existing factory registered master key system.
 - 2. Construction keying: furnish brass keyed-alike temporary cores plus 10 operating keys and 2 construction control keys. Temporary cores and keys remain property of hardware supplier.
 - 3. Owner will install permanent cylinders/cores.
- B. Interchangeable Cores: furnish utility patented, 7-pin solid brass construction.
- C. Locksets and cores: keyed at factory of lock manufacturer where permanent records are maintained.
 - 1. Locksets and cylinders same manufacturer.
- D. Permanent keys and cores: use secured shipment direct from point of origination to Owner.
 - 1. For estimate: 3 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
 - 2. For estimate: VKC stamping plus "DO NOT DUPLICATE".
- E. Bitting List: use secured shipment direct from point of origination to Owners upon completion.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS:

- A. Can read and understand manufacturers' templates, suppliers' hardware schedule and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

3.2 PREPARATION:

- A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation. Installation denotes acceptance of wall/frame condition.
- A. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
 - 1. Notify Architect of code conflicts before ordering material.
 - 1. Locate latching hardware between 34 inches to 44 inches above the finished floor, per California Building Code, Section 1010.1.9.2 and 11B-404.2.7.
 - 2. Locate panic hardware between 36 inches to 44 inches above the finished floor.

3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.
- B. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.3 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
 2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
 3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
 4. Replace fasteners damaged by power-driven tools.
- B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.
- D. Locate overhead stops for minimum 90 degrees at rest and for maximum allowable degree of swing.
- E. Drill pilot holes for fasteners in wood doors and/or frames.
- F. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

3.4. ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
1. Hardware damaged by improper installation or adjustment methods: repair or replace to Owner's satisfaction.
 2. Adjust doors to fully latch with no more than 1 pound of pressure.
 - a) Door closer valves: turn valves clockwise until at bottom – do not force. Turn valves back out one and one-half turns and begin adjustment process from that point. Do not force valves beyond three full turns counterclockwise.
 3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
 4. Adjust door closers per 1.9 this section.

- B. Inspection of fire door assemblies and means-of-egress panic-hardware doors: Per 2019 NFPA-80 5.2.1: hire an independent third-party inspection service to prepare a report listing these doors, and include a statement that there are zero deficiencies with the fire-rated assemblies and the openings with panic hardware.
 - 1. Per 2019 NFPA-80 5.2.1: Use a third party inspector not associated with the construction, supply or installation of this project to develop a field survey of the doors and hardware. Survey is to be done by a member certified as a FDAI (Fire Door Assembly Inspector), Certified AHC (Architectural Hardware Consultant) or a certified testing laboratory: UL or Intertek. Certified Inspectors may be found at DHI.org, [Intertek](http://Intertek.com), or CAFDI.org.]
- C. Fire-rated doors:
 - 1. Wood doors: adjust to 0.125 inches clearance at heads, jambs, and meeting stiles.
 - 2. Steel doors: adjust to 0.063 inches minimum to 0.188 inches maximum clearance at heads, jambs, and meeting stiles.
 - 3. Adjust wood and steel doors to 0.75 inches maximum clearance (undercut) above threshold or finish floor material under door.
- D. Final inspection: Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following:
 - 1. Has re-adjusted hardware.
 - 2. Has evaluated maintenance procedures and recommend changes or additions, and instructed Owner's personnel.
 - 3. Has identified items that have deteriorated or failed.
 - 4. Has submitted written report identifying problems.

3.5 DEMONSTRATION:

- A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING:

- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
- B. Clean adjacent wall, frame and door surfaces soiled from installation / reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

- A. See door schedule in drawings for hardware set assignments.
- B. Do not order material until submittal has been reviewed, stamped, and signed by Architect's door hardware consultant.

- C. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

OVERTUR 98343 V1 /OPT0340081

HARDWARE GROUP NO. 01

For use on Door #(s):

101A

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	AUTO FLUSH BOLT	FB41P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB (AS REQUIRED)	689	IVE
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
2	EA	KICK PLATE	8402 10" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488FSBK PSA	BK	ZER
1	EA	MEETING STILE	44STST	STST	ZER

HARDWARE GROUP NO. 02

For use on Door #(s):

102A

104A

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM DEAD LOCK	L463T	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	PUSH PLATE	8200 8" X 16" CFC	630	IVE
1	EA	PULL PLATE	8302 10" 6" X 16" CFT	630	IVE
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 03

For use on Door #(s):

103A

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	CDSI-PA-AX-98-EO	626	VON
1	EA	PANIC HARDWARE	CDSI-PA-AX-98-NL-OP-110MD	626	VON
1	EA	MULLION STORAGE KIT	MT54	689	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX X K510-730 36-083	626	SCH
2	EA	MORTISE CYLINDER	20-061 ICX X K510-730 XQ11-948 36-083	626	SCH
4	EA	FSIC CORE	23-030	626	SCH
1	EA	DOOR PULL	VR910 DT	630	IVE
1	EA	DOOR PULL	VR910 NL	630	IVE
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	GASKETING	328AA-S AT JAMB LEGS	AA	ZER
1	SET	GASKETING	429AA-S AT HEAD	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	THRESHOLD	THRESHOLD AS DETAILED		
2	EA	DOOR SWEEP	39A	A	ZER

HARDWARE GROUP NO. 04

For use on Door #(s):

103B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	CDSI-PA-AX-98-NL-OP-110MD	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX X K510-730 XQ11-948 36-083	626	SCH
2	EA	FSIC CORE	23-030	626	SCH
1	EA	DOOR PULL	VR910 NL	630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	328AA-S AT JAMB LEGS	AA	ZER
1	SET	GASKETING	429AA-S AT HEAD	AA	ZER
1	EA	THRESHOLD	THRESHOLD AS DETAILED		
1	EA	DOOR SWEEP	39A	A	ZER

HARDWARE GROUP NO. 05

For use on Door #(s):

105A

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ACCESSIBLE STOREROOM LOCK	L9081T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 06

For use on Door #(s):

106A

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488FSBK PSA	BK	ZER

HARDWARE GROUP NO. 07

For use on Door #(s):

107A

107B

107C

107D

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	CDSI-PA-AX-98-EO	626	VON
1	EA	PANIC HARDWARE	CDSI-PA-AX-98-NL-OP-110MD	626	VON
1	EA	MULLION STORAGE KIT	MT54	689	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX X K510-730 36-083	626	SCH
2	EA	MORTISE CYLINDER	20-061 ICX X K510-730 XQ11-948 36-083	626	SCH
4	EA	FSIC CORE	23-030	626	SCH
1	EA	DOOR PULL	VR910 DT	630	IVE
1	EA	DOOR PULL	VR910 NL	630	IVE
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	GASKETING	328AA-S AT JAMB LEGS	AA	ZER
1	SET	GASKETING	429AA-S AT HEAD	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	THRESHOLD	THRESHOLD AS DETAILED		
2	EA	DOOR SWEEP	39A	A	ZER

Maintenance Materials, provide the following:

- As-built hardware schedule
- Copies of warranty information for each hardware type
- Binder of catalog cuts or complete catalog sections of items used, installation and maintenance/adjustment information.
- Collection of tools that were included with the hardware: wrenches, drivers, etc.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal channel ceiling framing.
- B. Gypsum board.
- C. Taped and sanded joint treatment.
- D. Texture finish.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C1396 - Gypsum Wallboard.
 - 2. ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.
 - 3. ASTM C514 - Nails for the Application of Gypsum Wallboard.
 - 4. ASTM C-1396 - Water Resistant Gypsum Backing Board.
 - 5. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track, and Rigid Furring Channels for Screw Application of Gypsum Board.
 - 6. ASTM C754 - Installation of Steel Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.
 - 7. ASTM C840 - Application and Finishing of Gypsum Board.
 - 8. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board.
 - 9. ASTM E90 - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
 - 10. ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
 - 11. ASTM C1658 - Standard Specification for Glass Mat Gypsum Panels Section 7
 - 12. ASTM D3273- Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

1.3 QUALITY ASSURANCE

- A. Applicator: Company specializing in gypsum board systems work with three years documented experience.

1.4 REGULATORY REQUIREMENTS

- A. Conform to 2022 CBC Chapter 7, Section 703.1 and tables 721.1(1), 721.1(2), and 721.1(3) for fire rated assemblies.
- B. Conform to 2022 CBC Chapter 25.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. During cold weather, in areas receiving gypsum board installation, maintain temperature range between 55° F. to 70° F. for 24 hours before, during and after gypsum board and joint treatment application.

- B. Provide ventilation during and following adhesives and joint treatment application. Use temporary air circulators in enclosed areas lacking natural ventilation. Under slow drying conditions, allow additional drying time between coats of joint treatment. Protect installed materials from drafts during hot, dry weather.

1.6 DELIVERY, STORAGE AND PROTECTION

- A. Deliver materials to the project site with manufacturer's labels intact and legible. Handle materials with care to prevent damage. Deliver fire rated materials bearing testing agency label and required fire classification numbers.
- B. Store materials inside under cover, stack flat, off of floor. Stack gypsum board so that long lengths are not over short lengths. Avoid overloading floor system. Store adhesives, joint treatment materials, metal items and gypsum board in a dry area.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Acceptable Manufacturers - Gypsum Board System
 1. United States Gypsum Co. 800-874-4968
 2. Gold Bond Building Products Div., 800-628-4625
 3. Georgia Pacific Corp., 800-2256119.
 4. Substitutions: Under provisions of Section 01 60 00.

2.2 GYPSUM BOARD MATERIALS

- A. Glass Mat Firecode X Gypsum Board (Glass-Mat Panels Mold Tough): ASTM C1177 and meet Section 7 of ASTM C1658; 5/8 inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges. Scores a 10 in mold resistance per ASTM D3273.
 1. USG Sheetrock Glass Mat Mold Tough
- B. Fire Rated Gypsum Board: ANSI/ASTM C1396; fire resistive type, UL rated type x, type C or type ULIX as required by fire design; 5/8 inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges.
 1. USG Sheetrock Firecode X, Firecode C and USG Sheetrock EcoSmart ULIX
- C. Moisture and Mold Resistant Gypsum Board: ASTM C1396 scoring 10 in mold resistance in accordance ASTM D3273; 5/8 inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges located in moisture sensitive areas.
 1. USG Sheetrock Mold Tough gypsum panels
 2. USG Sheetrock EcoSmart Mold Tough gypsum panels

2.3 ACCESSORIES

- A. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board suitable for STC rating required. USG Acoustical sealant manufactured by United States Gypsum Company.
- B. Corner Beads: Paper faced, galvanized metal with 30 year warranty against edge cracking, USG Sheetrock B1 XW corner bead

- C. Edge Trim: GA 201 and GA 216; Type LC bead with 30 year warranty against edge cracking, unless otherwise indicated. USG SHEETROCK Paper faced metal "J" trim, B9
- D. Control Joints: CEMCO 093 control joints
- E. Joint Materials: ASTM C475; reinforcing tape, joint compound, adhesive, water, and fasteners. Use tapes and compound recommended by gypsum board manufacturer for the use intended. Use ready mixed, drying type compounds except for moisture and glass mat panels subject to moisture after installation, use setting type joint compound, USG Easy Sand. Use taping compound for embedding tape and first coat over fasteners and flanges of corner beads and trim. Use topping compound for fill and finish coats.
- F. Spray Texture Finish: Equivalent to USG Spray Texture Finish manufactured by United States Gypsum Company.
- G. Fasteners:
 - 1. To Metal: Self-drilling, self tapping, type S, countersunk bugle head, drywall screws, conforming to ASTM C646, for use with power driven tools.
 - 2. To Wood: Type W screws length as required to provide minimum 3/4-inch penetration into wood and meet requirement of fire rating
 - 3. Fire-Rated Construction: Type and length of fasteners to comply with 2013 CBC Chapter 7 and Tables 7-A, 7-B and 7-C.
- H. Drywall Primer – USG Sheetrock First Coat
- I. Skim Coat material – USG Sheetrock All-Purpose joint compound

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine surfaces scheduled to receive gypsum board construction for conditions that will adversely affect execution, permanence and quality of work.
- B. Do not proceed with installation until conditions are satisfactory.
- C. Beginning of installation means acceptance of existing substrate.
- D. Beware of a condition known as "critical lighting." This condition causes shadows that accentuate even the slightest surface variations. A pigmented sealer will provide tooth for succeeding decorative coating, but "does not" equalize smoothness or surface texture. Any corrective active of the drywall must be done by the drywall contractor prior to decorating.

3.2 ACOUSTICAL ACCESSORIES INSTALLATION

- A. Install resilient channels at maximum 24 inches on center. Locate joints over framing members.
- B. Install acoustical sealant within partitions in accordance with manufacturer's instructions.
- C. Install continuous beads of the specified acoustical sealant to produce an effective sound seal at intersections of all partitions with floors, ceilings, walls, columns and other abutting construction so that the entire perimeter is sealed.
 - 1. Apply two continuous beads of sealant, one on each side of the partition.
 - 2. Sealant shall be power gun applied in the joints.

3. Backs of electrical boxes and similar appurtenances in the gypsum board shall be buttered with sealant and the perimeters sealed.
- D. All materials used in sound rated partitions shall be the same manufacture as that used in the tested, rated and approved partition.

3.3 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with ASTM C840 and manufacturer's instructions.
- B. Framing members: Examine all surfaces to receive gypsum board. Make certain that framing is plumb and true.
 1. The fastening surface of any framing or furring member shall not vary more than 1/8 in. from the plane of the faces of adjacent framing or furring members.
- C. Cutting: Cut gypsum board by scoring or by sawing, working from the face side. When cutting by scoring, the face paper shall be cut with a knife.
- D. The gypsum board shall then be snapped back away from the cut face. The back paper may be broken by snapping the gypsum board in the reverse direction or the back paper may be cut.
- E. All cut edges and ends shall be sanded, where necessary, to obtain neat joining when gypsum board is erected.
- F. Cut-outs or small openings in gypsum board shall be scored in outline on the face and back before knocking out or shall be cut out with a saw or other suitable tool. Openings shall not be made by punching.
- G. Neatly cut gypsum board to fit around all outlets and switch boxes. Where gypsum board meets projecting surfaces, scribe and neatly cut.
- H. Apply gypsum board with long dimension at parallel to framing members, and all abutting ends over framing members. Stagger end joints.
- I. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- J. Gypsum board of the maximum practicable length shall be used to minimize end joints. All end joints shall be neatly fitted and staggered. Joints on opposite sides of the partitions shall be so arranged as to occur on different studs.
- K. At door openings, cut gypsum board so that no joints occur within 12 in. of the corners of door openings.
- L. Use screws when fastening gypsum board to metal furring.
- M. Use screws when fastening gypsum board to wood furring or framing except where nails are required for UL fire rated assembly.
- N. .
- O. Place control joints consistent with lines of building spaces as indicated.
- P. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abutts dissimilar materials.

3.4 JOINT TREATMENT

- A. Inspect gypsum board installation prior to applying joint treatment. Correct all defects before proceeding.
- B. Taping and finishing compounds: Prepare and mix in accord with manufacturer's printed directions.
- C. Exposed surface of gypsum board in place shall be fully acceptable for application of deferred finishes to provide completed work free of flaws, with fasteners recessed and joints invisible.
- D. Spread joint compound evenly over all joints using a suitable tool and fill fastener depressions and metal trim.
- E. Center reinforcing tape on joint and press into fresh taping compound. Wipe down with sufficient pressure to remove excess compound and to leave sufficient compound under tape for proper bond, feathering and leaving free from blisters and tape wrinkles. Allow to dry.
- F. Fold reinforcing tape along center and apply to interior angles, following procedure for joints.
- G. With fine sandpaper, lightly sand the dry compound between coats to remove irregularities.
- H. Second coat of taping compound shall be applied to joints, feathering approximately 3 in. beyond edges of tape. Apply another coat to fastener heads, leaving flush with gypsum board surfaces.
- I. After sanding second coat, apply final skim coat feathering out approximately 2 in. beyond second coat. Apply a third coat to all fastener depressions and metal trim. Skim-coat all interior angles.
- J. After drying, sand lightly all surfaces; using caution not to excessively damage the face paper of the gypsum board.

3.5 FINISHING

- A. All drywall surfaces to receive paint shall receive a standard "orange-peel" texture. After the gypsum board is completely taped and sanded, apply a uniform splatter spray of finishing compound, Level 3. Prior to applying texture, roller apply a uniform coat of drywall primer to entire surface
- B. All drywall to receive vinyl wall covering or vinyl wall covering over tackable underlayment shall be taped, sanded, and prepared for the wall finish, Level 3.
- C. Where one (1) hour drywall assemblies are located above the ceiling as shown on the plans, the following applies: Drywall finish above the ceiling line does not require sanding of the taped joints or spackled screws, Level 1.
- D. Where gloss, semi-gloss, enamel or non-textured flat paints are used or where severe lighting conditions occur provide a Level 5 finish. A Level 5 finish per ASTM C840 requires a skim coat of joint compound and a uniform coat of drywall primer roller applied.
- E. Glass Mat panels will require two skim coats and a drywall primer roller applied
- F. Levels of gypsum board finish:
 - 1. Level 1: All joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

2. Level 2: All joints and interior angles shall have a tape embedded in joint compound and one separate coat of joint compound applied over all joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound tool marks and ridges are acceptable provided they do not impair the installation of any wall covering.
3. Level 3: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges. The prepared surface shall be coated with a drywall primer prior to the application of final finishes. See painting specification Section 09 90 00 for paint system to go over drywall primer.
4. Level 4: All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges. The prepared surface shall be coated with a drywall primer prior to the application of final finishes. See painting specification Section 09 90 00 for paint system to go over drywall primer.
5. Level 5: All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. A thin skim coat of joint compound, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. The prepared surface shall be coated with a drywall primer prior to the application of finish paint. See painting specification Section 09 90 00 for paint system to go over drywall primer.

3.6 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction. (please note this is not attainable with a drywall system)

3.7 CLEAN-UP

- A. Remove all rubbish and surplus materials from premises and dispose of it legally away from site.

END OF SECTION

SECTION 09 24 00

PORTLAND CEMENT PLASTERING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal furring and lathing.
- B. Portland cement plaster system.
- C. Machine applied surface finish with integral color coat.

1.2 RELATED SECTIONS

- A. Section 07 14 00 - Fluid Applied Waterproofing: Waterproofing of exterior masonry surfaces.
- B. Section 09 90 00 – Painting and Coating

1.3 REFERENCES

- A. ANSI/ASTM C91 - Masonry Cement.
- B. ASTM C150 - Portland Cement.
- C. ANSI/ASTM C206 - Finishing Hydrated Lime.
- D. ANSI/ASTM C207 - Hydrated Lime for Masonry Purposes.
- E. ASTM C631 - Bonding Compounds for Interior Plastering.
- F. ANSI/ASTM C897 - Aggregate for Job-Mixed Portland Cement-Based Plasters.
- G. ANSI/ASTM C926 - Application of Portland Cement-Based Plaster.
- H. PCA (Portland Cement Association) - Plaster (Stucco) Manual.
- I. 2022 California Building Code, Chapter 25.

1.4 QUALITY ASSURANCE

- A. Applicator: Company specializing in cement plasterwork with three years documented experience.

1.5 REGULATORY REQUIREMENTS

- A. Conform to California Building Code for fire rated assemblies as follows:
 - 1. Fire Rated Partitions: Listed assembly by California Building Code, Table 7-A.

1.6 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.

- B. Provide product data on plaster materials, characteristics and limitations of products specified.
- C. Submit sample charts of integral color and texture for plaster finish.

1.7 FIELD SAMPLES

- A. Provide sample panel under provisions of Section 01 33 00.
- B. Construct field sample panel, minimum 48 inches long by 48 inches wide, illustrating surface and color of finish coat.
- C. Locate where directed.
- D. Accepted sample may remain as part of the work.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply plaster when substrate or ambient air temperature is less than 50 degrees F nor more than 80 degrees F.
- B. Maintain minimum ambient temperature of 50 degrees F during and after installation of plaster.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Lathing Materials:
 - 1. ClarkDietrich, (513) 870-1100.
 - 2. Amico-Wewt, (714) 350-9280.
 - 3. United States Gypsum Co., (818) 956-1882.
 - 4. Gold Bond Building Products Div., (213) 435-4465.
- B. Accessories:
 - 1. Fry Reglet Corp., (818) 289-4744.
 - 2. H.K. Porter Company, Inc., (415) 591-4461.
 - 3. United States Gypsum Co., (818) 956-1882.
 - 4. Keene Metal Products Division (800) 624-2686.
 - 5. M.M. Systems Corporation, (800) 241-3460.
- C. Integral Color Finish:
 - 1. La Habra Products, Inc., (714) 774-1186.
 - 2. Expo Stucco Products Div., (714) 684-2682.
 - 3. Omega Products Corp., (800) 600-6634.

2.2 PLASTER BASE COAT MATERIALS

- A. Cement: ASTM C150, Normal - Type I.
- B. Lime: ASTM C206, Type S.
- C. Aggregate: In accordance with ASTM C897 and PCA Plaster (Stucco) Manual.
- D. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.

E. Sand: Except as provided elsewhere in these specifications, shall be clean and well graded from coarse to fine, meeting the requirements of ASTM C 897, except gradation of sand shall conform to the following requirements:

F.

Sieve Size	Percent Retained (By Weight) On Each Sieve	
	Max.	Min.
No. 4	0	0
No. 8	10	0
No. 16	40	10
No. 30	65	30
No. 50	90	70
No. 100	100	95

G. Bonding Agent: ASTM C932; type recommended for bonding plaster to concrete and concrete masonry surfaces.

H. Plaster Mix Reinforcement: Glass fibers, 1/2-inch nominal length, alkali resistant.

2.3 PLASTER FINISH COAT MATERIALS

- A. Premixed Finishing Coat: Exterior Color Coat manufactured by La Habra Products, Inc., or other listed "acceptable" manufacturer, color as selected by Architect from full range of manufacturer's standard and custom colors.
- B. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.

2.4 FURRING AND LATHING

- A. Metal Lath for Vertical Surfaces: 2.5-lb./sq. yd. expanded metal, galvanized, self-furring type.
- B. Metal Lath for Horizontal Surfaces: 3.4-lb./sq. yd. expanded metal, galvanized, 3/8-inch rib lath.
- C. Underlayment: Two layers of Type D building paper conforming to ASTM D226.
- D. Corner Mesh: Formed steel, minimum 26 gage thick; expanded flanges shaped to permit complete embedding in plaster; minimum 2 inches wide; galvanized finish.
- E. Corner Beads: Formed steel, minimum 26 gage thick; beaded edge, of longest possible length; sized and profiled to suit application; galvanized finish.
- F. Base Screeds: Formed steel, minimum 26 gage thick; square edge, of longest possible length; sized and profiled to suit application; galvanized finish.
- G. Drip screeds (weep screed): Formed steel; minimum 26 gage thickness, with weep holes; sized and profiled to suit application; galvanized finish.
- H. Casing Bead: Formed steel; minimum 26 gage thick; thickness governed by plaster thickness; maximum possible lengths; expanded metal solid flanges, with square edges; galvanized finish.
- I. Control and Expansion Joints: Equivalent to Keene XJ 15-3 with Unijoint II, galvanized finish.
- J. Interior Corner Joints: Equivalent to Keene Cornermaster #30, galvanized.
- K. Anchorages: Nails, staples, or other approved metal supports, of type and size to suit application, galvanized to rigidly secure lath and associated metal accessories in place.
- L. Polyethylene Sheet: Clear, 6 mil thick.

2.5 CEMENT PLASTER MIXES

- A. Mix and proportion cement plaster in accordance with ASTM C926 and PCA Plaster (Stucco) Manual.
- B. Base coat and Brown Coat: One part cement, minimum 3-1/2 and maximum 4 parts aggregate, and 0-3/4 parts hydrated lime, and glass fibers at a rate of 1-1/2 lbs. per sack of cement.
- C. Job Mixed Finish Coat: One part cement, three parts aggregate, and one part lime.
- D. Factory-Prepared Portland Cement Finish Coats: Add water only; comply with finish coat manufacturer's directions.
- E. Mix only as much plaster as can be used in one hour.

- F. Mix materials dry, to uniform color and consistency, before adding water.
- G. Protect mixtures from frost, contamination and evaporation.
- H. Do not retemper mixes after initial set has occurred.
- I. Completely discharge the mixer and remove all set or partially hardened materials before loading the next batch. Partially set materials shall not be retempered or reused.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Masonry: Verify joints are cut flush and surface is ready to receive work of this Section. Verify no bituminous or water repellent coatings exist on masonry surface.
- C. Concrete: Verify surfaces are flat, honeycomb is filled flush, and surface is ready to receive work of this Section. Verify no bituminous, water repellent, or form release agents exist on concrete surface that are detrimental to plaster.
- D. Grounds and Blocking: Verify items within walls for other Sections of work have been installed.
- E. Mechanical and Electrical: Verify services within walls have been tested and approved.
- F. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- G. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Protect surfaces near the work of this Section from damage or disfiguration.
- B. Dampen masonry surfaces to reduce excessive suction.
- C. Clean concrete surfaces of foreign matter. Clean surfaces using acid solutions, solvents, or detergents. Wash surfaces with clean water.
- D. Roughen smooth concrete surfaces and apply bonding agent. Apply in accordance with manufacturer's instructions.

3.3 INSTALLATION - LATHING MATERIALS

- A. Apply two plies of underlayment over substrate; weatherlap edges 4 inches minimum. Fasten in place.
- B. Install penetration flashing around all openings in exterior walls, soffits and ceilings in accordance with CBC Section 1404.4, including sealant.
- C. Apply self-furring reinforcement with self-furring ribs perpendicular to supports.
- D. Lap ends minimum one inch. Secure end laps with tie wire where they occur between supports.

- E. Lap sides of diamond mesh lath minimum 1-1/2 inches. Nest outside ribs of rib lath together.
- F. Attach metal lath to wood supports using nails at maximum 6 inches on center. In addition, secure lath to each support with 1/2 inch wide, 1-1/2" long No. 9 W&M gage ring shank, hook staple placed around a 10d common nail laid flat under the surface of the lath not more than three inches from the edge of each sheet.
- G. Attach metal lath to concrete masonry using wire hair pins, hooks or loops. Ensure that anchors are securely attached to concrete and spaced at maximum 24 inches on center.
- H. Continuously reinforce internal angles with corner mesh, except where corner master joint is shown. Fasten at perimeter edges only.
- I. Place beaded external angle with mesh at corners. Fasten at outer edges only.
- J. Place 6" wide strips of mesh by 36" long diagonally at corners of all lathed openings. Secure rigidly in place.
- K. Place 4-inch wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.
- L. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
- M. Install accessories to lines and levels.

3.4 CONTROL AND EXPANSION JOINTS

- A. Locate interior control and expansion joints as indicated or maximum of 12' each way.
- B. Locate exterior control and expansion joints as indicated on drawings or maximum of 12'-0" o.c. each way.
- C. Establish control and expansion joints with specified joint device or maximum of 12'-0" o.c. each way.
- D. Coordinate joint placement with other related work.

3.5 PLASTERING

- A. Apply plaster in accordance with ASTM C926 and PCA Plaster (Stucco) Manual.
- B. Scratch Coat: about 3/8" thick to thoroughly embed lath. Score and scratch horizontally for good bond obtainable in second coat.
- C. Brown Coat: Apply to dampened surfaces about 3/8" thick; rod and float to true and even surface with not over 1/8" variation when tested by 5' straight edge, leave sufficiently rough to assure adequate bond for finish coat.
 - 1. Make no cold joints in brown coat over cold joints in the scratch coat. Leave brown coat surface free of imperfections which might reflect in the finish coat.
- D. Finish Coat: Stucco shall have integral color similar to La Habra as manufactured by La Habra Product Corp., or equal. Color from manufacturer's standard chart as approved by Architect. Apply by machine in two (2) coats with a medium dash finish.

- E. Curing: Moist cure coat 48 hours. Apply brown coat when scratch has cured minimum of 48 hours and set up enough to carry weight of both loads. Moist cure brown coat for 48 hours; allow to dry for five days. Apply finish not sooner than seven days after brown coat. Moist cure 48 hours. Lightly dampen brown coat before applying finish coat. Maintain moist conditions by fine fog spray during curing.
 - 1. Cure finish coat for a minimum of 7 days. Maintain moist conditions by fine fog spray.
- F. Carefully mask: All adjacent areas to protect from machine applied plaster.

3.6 TOLERANCES

- A. Maximum Variation From True Flatness: 1/8 inch in 10 feet.

3.7 ADJUSTMENTS

- A. Should any integrally colored plaster surfaces be damaged or otherwise unsatisfactory to the extent that repairs are deemed necessary by the Architect, such patching and repairs shall be carried to the limits determined by the Architect and, if necessary, to produce an acceptable appearance, the entire finish coats replaced with new and acceptable workmanship and materials.

END OF SECTION

SECTION 09 30 11

CERAMIC TILE FLOOR FINISH

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Ceramic tile floor and base finish using the **Full Mortar Bed** application method.

1.2 REFERENCES

- A. Tile Council of America:
 1. ANSI/TCA A108.1 - Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile Installed with Portland Cement Mortar.
 2. ANSI/TCA A108.5 - Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
 3. ANSI/TCA A118.4 - Latex-Portland Cement Mortar.
 4. ANSI/TCA A137.1 - Specifications for Ceramic Tile.
 5. Tile Council of America (TCA) - Handbook for Ceramic Tile Installation.

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Submit shop drawings indicating tile layout and patterns, color arrangement, perimeter conditions, and junctions with dissimilar materials.
- C. Submit samples under provisions of Section 01 33 00.
- D. Mount tile and apply grout on two 24 x 24 inch plywood panels, to indicate pattern, color variations, and grout joint size variations.
- E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- F. Submit manufacturer's certificate under provisions of Section 01 33 00 that products meet or exceed ANSI/TCA A137.1.
- G. Submit maintenance data under provisions of Section 01 70 00.
- H. Include recommended cleaning and stain removal methods, and cleaning materials.

1.4 QUALITY ASSURANCE

- A. Conform to ANSI/TCA A137.1.
- B. Conform to Tile Council of America (TCA) Handbook for Ceramic Tile Installation.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum three years documented experience.
- B. Installer: Company specializing in applying the work of this Section with minimum three years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain 50 degrees F during installation of mortar materials. Heat rooms thoroughly prior to beginning work.

PART 2 PRODUCTS

2.1 MANUFACTURERS - TILE

- A. Interceramic, Inc., (714) 956-7565.
- B. Dal-Tile Corp., (714) 825-1514.
- C. Substitutions: Under provisions of Section 01 60 00.

2.2 TILE MATERIAL

- A. Ceramic Floor Tile: ANSI/TCA A137.1, conforming to the following:
 - 1. Moisture Absorption: 0 to 0.5 percent.
 - 2. Size: 12 x 12 x 1/4" inch.
 - 3. Edge: Square.
 - 4. Surface Finish: Mottle glazed with 10% non-skid aggregate in glaze.
 - 5. Friction Coefficient: 0.6 or higher per ASTM C1028.
 - 6. Ceramic Tile Flooring shall be stable, firm, and slip resistant. CBC Section 11B-302.1
 - 7. Color: As selected by Architect from manufacturer's full range of standard and premium colors, maximum of 3 colors.
- B. Base: Match floor tile for moisture absorption, surface finish and color; tile 8" inch long x 6" inch high; special order non-bullnosed, flat top edge, coved internal corner. Face of base tile shall be flush with face of wall tile.

2.3 MANUFACTURERS - MORTAR AND GROUT

- A. Custom Building Products, (213) 728-7571.
- B. Dal-Tile Corp., (714) 825-1514.
- C. W.R. Bonsal Company, (818) 333-2217.
- D. H.B. Fuller Company, (213) 582-0846.
- E. L & M Manufacturing Inc., (201) 254-4830.

F. Substitutions: Under provisions of Section 01 60 00.

2.4 MORTAR MATERIALS

A. Portland Cement Mortar Materials: ANSI/TCA A108.1.

B. Latex-Portland Cement Mortar: ANSI/TCA A118.4 and the following:

1. Acrylic resin latex additive.
2. Dry mortar mix supplied by latex manufacturer.

2.5 GROUT MATERIALS

A. Commercial Portland Cement Grout: ANSI/TCA A118.6 of color selected.

B. Latex-Portland Cement Grout: ANSI/TCA A118.6 of color selected and the following:

1. Acrylic resin latex additive.
2. Dry mortar mix supplied by latex manufacturer.

C. Grout product shall be similar to Polyblend Sanded Tile Grout as manufactured by Custom Building Products.

2.6 ACCESSORIES

A. Shower Pan Material: ASTM D4551, Grade 40, compositel polyvinyl chloride sheet manufactured by Compositel Corporation, (213) 483-4444.

B. Reinforcing Mesh: 2 x 2-inch size weave of WO3/WO3 wire size; welded fabric, galvanized.

2.7 MORTAR MIX AND GROUT MIX

A. Mix and proportion pre-mix setting bed and grout materials in accordance with manufacturer's instructions, and referenced standards.

2.8 GROUT SEALER

A. TileLab Grout and Tile Sealer as manufactured by Custom Building Products, or an approved equal.

2.9 EXTRA MATERIAL

A. Provide 150 square feet of each color of floor tile under provisions of Section 01 70 00.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts condition of existing surfaces.

3.2 PREPARATION

A. Protect surrounding work from damage or disfiguration.

- B. Vacuum clean existing surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install shower pan in accordance with manufacturer's instructions, using recommended solvent cement to weld joints when pan dimensions exceed maximum width roll.

3.3 INSTALLATION - FULL MORTAR BED METHOD

- A. Over interior concrete slabs, install in accordance with TCA handbook method W244, with standard grout.
- B. Lay tile to pattern indicated on Drawings, or if not indicated, request from Architect. Do not interrupt tile pattern through openings.
- C. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align floor, base, and wall joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight without voids, cracks, excess mortar, or excess grout. Pour metal reducer edge strips at transitions upper doors to different material.
- E. Sound tile after setting. Replace hollow sounding units.
- F. Keep control joints free of mortar or grout.
- G. Allow tile to set for a minimum of 48 hours prior to grouting. Protect surface from other trades.
- H. Grout tile joints.
- I. Provide expansion joints around entire perimeter of each room and every 100 square feet maximum. Provide and install per Tile Counsel of America (TCA) Handbook. Include a flexible sealant atop each expansion joint per manufacturer's recommendations.

3.4 CLEANING

- A. Clean work under provisions of 01 70 00.
- B. Clean tile surfaces.

3.5 PROTECTION

- A. Protect grout against staining until sealer is applied. Stained grout shall be removed and replaced prior to Notice of Completion.
- B. Protect finished installation under provisions of Section 01 70 00.
- C. Do not permit traffic over finished floor surface for 72 hours after installation.

END OF SECTION

SECTION 09 30 12

CERAMIC TILE WALL FINISH

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Ceramic tile walls and wainscot finish using the **Full Setting Bed** application method.

1.2 REFERENCES

- A. Tile Council of America:
 1. ANSI/TCA A108.1 - Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile Installed with Portland Cement Mortar.
 2. ANSI/TCA A108.5 - Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
 3. ANSI/TCA A118.4 - Latex-Portland Cement Mortar.
 4. ANSI/TCA A137.1 - Specifications for Ceramic Tile.
 5. Tile Council of America (TCA) - Handbook for Ceramic Tile Installation.

1.3 SUBMITTALS

- A. Submit samples under provisions of Section 01 33 00.
- B. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- C. Submit maintenance data under provisions of Section 01 70 00.
- D. Include recommended cleaning and stain removal methods, and cleaning materials.

1.4 QUALITY ASSURANCE

- A. Conform to ANSI/TCA A137.1.
- B. Conform to Tile Council of America (TCA) Handbook for Ceramic Tile Installation.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum three years documented experience.
- B. Installer: Company specializing in applying the work of this Section with minimum three years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS - TILE

- A. Interceramic, Inc., (714) 956-7565.
- B. Dal-Tile Corp., (714) 825-1514.
- C. Substitutions: Under provisions of Section 01 60 00.

2.2 TILE MATERIAL

- A. Ceramic Wall Tile: ANSI/TCA A137.1, conforming to the following:
 - 1. Moisture Absorption: 0.5 to 3.0 percent.
 - 2. Size: 4 1/4 x 4 1/4 x 1/8 inch.
 - 3. Edge: Cushioned.
 - 4. Surface Finish: Semi-Gloss.
 - 5. Color: As selected from manufacturer's full range of standard and premium colors, minimum two primary colors and four accent colors. Specific pattern to be issued by Architect prior to installation. Bid shall allow for 45-degree cuts to accent tiles.
- B. Wainscot Cap: Match wall tile for moisture absorption, surface finish and color; tile length 4 1/4" long x 4 1/2" high, bullnosed top edge.

2.3 ACCENT TILE MATERIAL

- A. Glass Wall Tile: Conforming to the following:
 - 1. Moisture Absorption: 0.5 to 3.0 percent.
 - 2. Size: 4-1/4 x 4-1/4 x 5/16 inch.
 - 3. Edge: Cushioned.
 - 4. Color: As selected from manufacturer's full range of standard and premium colors, minimum four accent colors. Specific pattern to be issued by Architect prior to installation. Bid shall allow for 45-degree cuts to accent tiles.

2.4 MANUFACTURERS - MORTAR AND GROUT

- A. Custom Building Products, (213) 728-7571.
- B. Dal-Tile Corp., (714) 825-1514.
- C. W.R. Bonsal Company, (818) 333-2217.
- D. H.B. Fuller Company, (213) 582-0846.
- E. L & M Manufacturing Inc., (201) 254-4830.
- F. Substitutions: Under provisions of Section 01 60 00.

2.5 MORTAR MATERIALS

- A. Portland Cement Mortar Materials: ANSI/TCA A108.1.
- B. Latex-Portland Cement Mortar: ANSI/TCA A118.4 and the following:
 - 1. Acrylic resin latex additive.
 - 2. Dry mortar mix supplied by latex manufacturer.

2.6 GROUT MATERIALS

- A. Latex-Portland Cement Grout: ANSI/TCA A118.6 of color selected and the following:
 - 1. Acrylic resin latex additive.
 - 2. Dry mortar mix supplied by latex manufacturer.
- B. Grout product shall be similar to Polyblend Non-Sanded Tile Grout as manufactured by Custom Building Products.

2.7 ACCESSORIES

- A. Cleavage Membrane: 4-mil thick polyethylene film.
- B. Reinforcing Mesh: 2 x 2 inch size weave of WO.3 wire size; welded fabric, galvanized.

2.8 MORTAR MIX AND GROUT MIX

- A. Mix and proportion pre-mix setting bed and grout materials in accordance with manufacturer's instructions, and referenced standards.

2.9 GROUT SEALER

- A. TileLab Grout and Tile Sealer as manufactured by Custom Building Products, or an approved equal.

2.10 EXTRA MATERIAL

- A. Provide 150 square feet of each color under provisions of Section 01 70 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts condition of existing surfaces.

3.2 PREPARATION

- A. Protect surrounding work from damage or disfiguration.
- B. Vacuum clean existing surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.3 INSTALLATION – FULL SETTING BED METHOD

- A. Over interior walls, install in accordance with TCA handbook method W244, with standard grout.
- B. Apply mortar bed over surfaces to a thickness of 5/8 inch.
- C. Lay tile to pattern indicated on Drawings, or if not indicated, request from Architect. Do not interrupt tile pattern through openings.
- D. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align floor, base, and wall joints.
- E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight without voids, cracks, excess mortar, or excess grout.
- F. Form internal angles square and external angles bullnosed.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control joints free of mortar or grout. Supply sealant to joints.
- I. Allow tile to set for a minimum of 48 hours prior to grouting.
- J. Grout tile joints.

3.4 CLEANING

- A. Clean work under provisions of 01 70 00.
- B. Clean tile surfaces.

3.5 PROTECTION

- A. Protect grout against staining until sealer is applied. Stained grout shall be removed and replaced prior to Notice of Completion.
- B. Protect finished installation under provisions of Section 01 70 00.
- C. Protect corner tiles from damage by other trades.

END OF SECTION

SECTION 09 60 00

RESILIENT BASE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient base.
- B. Related Sections
 - 1. Section 09 65 00 Resilient Flooring
 - 2. Section 09 67 23 Resinous Flooring
 - 3. Section 09 68 13 Tile Carpeting
 - 4. Section 09 68 16 Sheet Carpeting

1.2 REFERENCES

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source (Flooring Radiant Panel Test).
- C. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.
- D. FS LLL-F-1238A Residual Indentation.
- E. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.3 REGULATORY REQUIREMENTS

- A. Conform to 2022 California Building Code for flame/fuel/smoke rating requirements in accordance with ASTM E84.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Submit samples under provisions of Section 01 33 00.
- C. Submit three samples 3 x 3 inches in size, illustrating color and pattern for each floor material specified.
- D. Submit three 2 inch long samples of base material for each color specified.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01 70 00.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during and 24 hours after installation of materials.

1.7 EXTRA MATERIALS

- A. Provide extra flooring equal to 3% of the total units installed, but not less than two full boxes of each material specified under provisions of Section 01 70 00.
- B. Provide extra base material equal to 3% total material installed, but not less than 30 lineal feet of each material specified under provisions of Section 01 70 00.
- C. Provide extra a minimum of 10 gallons of adhesive material as specified under provisions of Section 01 70 00.

PART 2 PRODUCTS

2.1 MANUFACTURERS - RESILIENT BASE

- A. Burke Flooring Products, (213) 724-0330.
- B. Armstrong World Industries, (714) 680-7200.
- C. Flexco Co., (800) 633-3151.
- D. R.C. Musson Rubber Co., Inc., (216) 773-7651.
- E. Substitutions: Under provisions of Section 01 33 00.

2.2 BASE MATERIALS

- A. Base: FS SS-W-40, Type I rubber; 4 inch high, 1/8 inch thick; rolled top set covered with pre-molded external corners. Provide base from roll stock, not 4 foot pieces.
- B. Base Accessories: Pre-molded end stops and external corners of same material, size, and color as base.
- C. Color: Allow for a maximum of three colors as selected by Architect from full range of manufacturer's colors.

2.3 ACCESSORIES

- A. Sub-floor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Edge Strips: Flooring material.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft, and are ready to receive work.
- B. Beginning of installation means installer accepts condition of the existing substrate and site conditions.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
- C. Prohibit traffic from area until filler is cured.
- D. Vacuum clean substrate.
- E. Apply primer to concrete slab surfaces if recommended by flooring manufacturer.

3.3 INSTALLATION - BASE MATERIAL, STAIR NOSINGS AND RISER FACES

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
- B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends use pre-molded units.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.4 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.

3.5 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. The following process is to be done with a mop bucket and wringer utilizing a cotton mop head for absorbency.
 - 1. Mix Waxie Re-Mov-It Stripper(320802)at a rate of 10 to 1 dilution rate and apply by flooding and leave standing for 15 minutes without allowing the floor to dry (Dry Back).
 - 2. With a 175 RPM rotary floor machine and a black pad thoroughly scrub the floor to remove finish and then remove slurry with a wet/dry vacuum.
 - 3. Clean floor edges and base with the appropriate scrapers, brushes and chemical to completely clean these surfaces.
 - 4. With a fresh mop bucket and wringer, clean cotton mop head and clean water, double rinse the floor using two Waxie Neutralizing pouches (320250). Wait for floor to completely dry.

5. Apply Butcher's Ironstone Floor finish (931702) in accordance with the manufacturer's instructions.
 - a. With a clean Synthetic mop head apply three coats of Ironstone Floor Finish, allowing 30 minutes drying time between coats.
6. Clean up all materials and equipment used and store properly.

3.6 MAINTENANCE

- A. Return six months after Notice of Completion to replace and reattach loose tile and base.
- B. Clean and reapply wax at any area where repairs are made.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Related Sections
 - 1. Section 09 60 00 - Resilient Base

1.2 REFERENCES

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source (Flooring Radiant Panel Test).
- C. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.
- D. FS LLL-F-1238A Residual Indentation.
- E. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.3 REGULATORY REQUIREMENTS

- A. Conform to 2022 California Building Code for flame/fuel/smoke rating requirements in accordance with ASTM E84.
- B. Resilient Tile floor finish shall be stable, firm, and slip resistant per CBC 11B-302.1.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Provide seaming plan.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit three samples 3 x 3 inches in size, illustrating color and pattern for each floor material specified.
- E. Submit three 2 inch long samples of base material for each color specified.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01 70 00.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during and 24 hours after installation of materials.

1.7 EXTRA MATERIALS

- A. Provide extra flooring equal to 3% of the total units installed, but not less than two full boxes of each material specified under provisions of Section 01 70 00.
- B. Provide extra base material equal to 3% total material installed, but not less than 30 lineal feet of each material specified under provisions of Section 01 70 00.
- C. Provide extra a minimum of 10 gallons of adhesive material as specified under provisions of Section 01 70 00.

PART 2 PRODUCTS

2.1 MANUFACTURERS - RESILIENT TILE FLOORING

- A. Armstrong World Industries, (800) 841-4630, Multicolor Excelon.
- B. Azrock, (713) 869-5811, Custom Cortina.
- C. Tarkett, Inc., (800) 225-6500.
- D. Substitutions: Under provisions of Section 01 33 00.

2.2 RESILIENT TILE FLOORING MATERIAL

- A. Vinyl Composition Tile: FS SS-T-312, Type IV, Composition 1; 12 x 12 inch size, 1/8 inch thick; minimum coefficient of friction = 0.6 per ASTM D2047, marbleized design.
- B. Color: Allow for a maximum of four colors as selected by Architect from manufacturer's full range of colors. Pattern to be selected by Architect.
- C. All areas scheduled to have VCT shall be provided with 6" wide accent border. Color to be selected from manufacturer's full range of colors.
- D. Feature Strips: Of same material as tile, 4 inch wide.

2.3 ACCESSORIES

- A. Sub-floor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Edge Strips: Flooring material.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft, and are ready to receive work.
- B. Beginning of installation means installer accepts condition of the existing substrate and site conditions.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
- C. Prohibit traffic from area until filler is cured.
- D. Vacuum clean substrate.
- E. Apply primer to concrete slab surfaces if recommended by flooring manufacturer.

3.3 INSTALLATION – RESILIENT FLOORING MATERIAL

- A. Install in accordance with manufacturer's instructions.
- B. Mix resilient flooring from container to ensure shade variations are consistent.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Set resilient flooring in place. Press with heavy roller to attain full adhesion.
- E. Lay flooring with joints and seams parallel to building lines to produce minimum number of seams.
- F. Install resilient flooring to square grid pattern with all joints aligned and with pattern grain parallel for all units and parallel to length of room. Allow minimum 1/2 full size resilient flooring width at room or area perimeter.
- G. Terminate resilient flooring at centerline of door openings where adjacent floor finish is dissimilar.
- H. Install edge strips at unprotected or exposed edges, and where resilient flooring terminates.
- I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- J. Install resilient flooring in pan-type floor access covers at utility trenches and operable J-boxes. Maintain floor pattern.
- K. Install resilient flooring under movable partitions without interrupting floor pattern.
- L. Install feature strips, edge strips, and floor markings where indicated. Fit joints tightly.

- M. Cove resilient sheet flooring up wall 4 inches minimum to create integral base weld corner cove joints. Finish top edge of base with continuous aluminum edging as recommended by manufacturer.

3.4 INSTALLATION - BASE MATERIAL, STAIR NOSINGS AND RISER FACES

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
- B. Miter internal corners. At external corners, "V" cut back of base strip to 2/3 of its thickness and fold. At exposed ends use pre-molded units.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.5 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.

3.6 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. The following process is to be done with a mop bucket and wringer utilizing a cotton mop head for absorbency.
 - 1. Mix Waxie Re-Mov-It Stripper(320802)at a rate of 10 to 1 dilution rate and apply by flooding and leave standing for 15 minutes without allowing the floor to dry (Dry Back).
 - 2. With a 175 RPM rotary floor machine and a black pad thoroughly scrub the floor to remove finish and then remove slurry with a wet/dry vacuum.
 - 3. Clean floor edges and base with the appropriate scrapers, brushes and chemical to completely clean these surfaces.
 - 4. With a fresh mop bucket and wringer, clean cotton mop head and clean water, double rinse the floor using two Waxie Neutralizing pouches (320250). Wait for floor to completely dry.
 - 5. Apply Butcher's Ironstone Floor finish (931702) in accordance with the manufacturer's instructions.
 - a. With a clean Synthetic mop head apply three coats of Ironstone Floor Finish, allowing 30 minutes drying time between coats.
 - 6. Clean up all materials and equipment used and store properly.

3.7 MAINTENANCE

- A. Return six months after Notice of Completion to replace and reattach loose tile and base.
- B. Clean and reapply wax at any area where repairs are made.

END OF SECTION

SECTION 09 65 66

RUBBER SPORTS FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Recycled Rubber Resilient Flooring
- B. Adhesives

1.2 RELATED SECTIONS

- A. 03 30 00 – Cast-in-Place Concrete

1.3 REFERENCES

- A. 2022 California Building Code - Chapter 25.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM D3676 Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay
 - 2. ASTM D2240 Standard Test Method for Rubber Property-Durometer Hardness
 - 3. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers – Tension.
 - 4. ASTM D624 Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
 - 5. ASTM F137 Test Method for Flexibility of Resilient Flooring Materials.
 - 6. ASTM F710 Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
 - 7. ASTM F925 Test Method for Resistance to Chemicals of Resilient Flooring.
- C. California Department of Public Health (CDPH)
 - 1. California Department of Public Health CDPH/EHLB/Standard Method Version 1.1, 2010 (Emission testing method for CA Specification 01350)QUALITY ASSURANCE

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 - 1. Certificate: Submit certificate indicating qualifications.
 - 2. Company with five years minimum documented experience, approved by manufacturer.
- B. Manufacturer's Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.

1.5 REGULATORY REQUIREMENTS

- A. Conform to California Building Code.

1.6 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.

- B. Indicate on shop drawings, layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
- C. Provide product data, including manufacturer's guide specifications product sheet, for specified products.
- D. Submit samples under provisions of Section 01 33 00.
- E. Submit two samples 6 x 6 inch in size, illustrating material finishes, colors and textures.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Maintain air temperature in spaces where products will be installed for time period before, during and after installation as recommended by manufacturer.

1.8 DELIVERY, STORAGE & HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store materials at temperature and humidity conditions recommended by manufacturer and protect from exposure to harmful weather conditions.

1.9 WARRANTY

- A. Submit manufacturer's standard five (5) year warranty document executed by authorized company official.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Regupol America LLC, or equal.
Contact: 33 Keystone Drive, Lenanon, PA 17042; Telephone: (800) 537-8737, (717) 675-2199, www.regupolamerica.com.
- B. Substitutions: Under provisions of Section 01 33 00. Must have DSA product acceptance number.

2.2 MATERIALS

- A. Regupol Aktiv
 1. Roll Dimension: 48" wide x 3/8" thick
 2. Roll Length: Maximum allowed by manufacturer
 3. Colors: As selected from manufacturer's full range of standard and premium colors, maximum of 2 colors.
- B. Product Testing:
 1. Density, (ASTM D3676), 60 pcf.
 2. Hardness, (ASTM D2240 Shore A), 60 +/- 5
 3. Tear Strength, (ASTM D624), 80 pli min.
 4. Elongation, (ASTM D412), >145%
 5. Tensile Strength, (ASTM D412), >220 PSI
 6. Flexibility, 1/4-inch mandrel (ASTM F137): pass.

- 7. Chemical Resistance (ASTM F925):
 - a. 5% Acetic Acid: No Change
 - b. 70% Isopropyl Alcohol: No Change
 - c. 5% Sodium Hydroxide: No Change
 - d. 5% Hydrochloric Acid: No Change
 - e. 5% Ammonia: No Change
 - f. Bleach: No Change
 - g. 5% Phenol: No Change
 - h. Sulfuric Acid: No Change
 - 8. IAQ Testing, CDPH Std 01350 : Pass
- C. Regupol PU350 one-component polyurethane adhesive
 - D. Obtain recycled rubber resilient flooring materials from a single manufacturer.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that existing conditions are ready to receive work.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.
- B. Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
- C. Prepare surface per manufacturer's instructions.
- D. Comply with manufacturer's technical instructions for procedures and techniques.
- E. Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

3.3 CLEANING

- A. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

3.4 PROTECTION

- A. Protect installed product and finished surfaces from damage during construction.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Surface finish schedule.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
 - 2. ASTM D2016 - Test Method for Moisture Content of Wood.
- B. Structural Steel Painting Council.

1.3 DEFINITIONS

- A. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.

1.4 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with three years experience.
- B. Applicator: Company specializing in commercial painting and finishing with three years documented experience.
- C. Regulatory Requirements: Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with these Specifications, comply with the more stringent provisions. Regulatory changes may affect the formulation, availability, or use of specified coatings. Confirm availability of coatings to be used prior to job going out to bid and before start of painting project.
 - 1. Comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).
- D. Field Sample: When and as directed by the Architect, apply one complete coating system for each color, gloss and texture required. When approved, the sample panel areas will be deemed incorporated into the work and will serve as the standards by which the subsequent work of this Section will be judged.

1.5 SUBMITTALS

- A. Submit samples under provisions of Section 01 33 00.
- B. Submit two samples 8 x 10 inch in size of each paint color and texture applied to cardboard. Resubmit samples until acceptable color, sheen and texture is obtained.

- C. On actual wood surfaces, submit two 4 x 8 inch samples of natural wood.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site and store and protect under provisions of Section 01 70 00.
- B. Deliver products to site in new, original, sealed and labeled containers; inspect to verify acceptance.
- C. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
- D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.
- E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- B. Do not apply exterior coatings during fog, rain, mist or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish and Urethane Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.
- F. Avoid painting surfaces when exposed to direct sunlight.
- G. No exterior or interior painting shall be done until the surfaces are thoroughly dry and cured.

1.8 EXTRA STOCK

- A. Provide a three-gallon container of each color to Owner.
- B. Label each container with color, texture, and room locations, and in addition to the manufacturer's label.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - PAINT

- A. Sherwin-Williams, John Dumesnil, 619-665-9341 or john.t.dumesnil@sherwin.com.
- B. Dunn-Edwards Corporation, (209) 572-0555.

- C. Frazee Paint & Wallcovering, (714) 936-2890
- D. Substitutions: Under provisions of Section 01 60 00.

2.2 MATERIALS

- A. Coatings: Ready mixed, except field-catalyzed coatings. Pigments shall be fully ground maintaining a soft paste consistency, capable of being readily and uniformly dispersed to complete a homogeneous coating.
- B. Coatings: Good flow and brush properties; capable of drying or curing free of streaks or sags.
- C. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated, but required to achieve the finishes specified, of commercial quality and approved by manufacturer.

2.3 FINISHES

- A. Refer to schedule at end of Section for surface finish schedule.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Beware of a condition known as "critical lighting." This condition causes shadows that accentuate even the slightest surface variations. A pigmented sealer will provide tooth for succeeding decorative coating, but "does not" equalize smoothness or surface texture. Any corrective action of the drywall must be done by the drywall contractor prior to decorating.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent
 - 2. Masonry, Concrete and Concrete Unit Masonry: 12 percent
 - 3. Interior Located Wood: 15 percent, measured in accordance with ASTM D2016
 - 4. Exterior Located Wood: 15 percent, measured in accordance with ASTM D2016
- E. Beginning of installation means acceptance of existing surfaces.

3.2 SURFACE PREPARATION FOR PREVIOUSLY COATED SUBSTRATES

- A. No substrate is to be painted until proper preparation is completed. Do test area for each coating specified to determine compatibility with, and adherence to existing coatings on surfaces. When coating to be applied is incompatible with existing coating, mechanical blasting will be required to remove the existing coating completely.
- B. Remove hardware, light fixtures, electrical plates, and any other devices which don't require painting.

- C. Plaster, concrete, wood, and metal will be washed with TSP to remove all dirt, grease, and any foreign matter which could prevent proper adhesion of coatings. Cleaning to be in accordance with paint manufacturer's recommendations. All loose paint will be removed by whatever means required. Surfaces must be sound and existing coatings completely removed if necessary. Light sanding (scuffing) followed by dust removal will be done to degloss surfaces. Cracks, gouges, and holes will be filled with appropriate filler and smoothed to blend with adjacent areas. Metal surfaces will be prepared to SSPC-SP11.
- D. Gypsum board will be cleaned with soap and warm water. Cracks and holes will be filled with patching compound and finished to Level 4 as defined in Section 09 21 16 – Gypsum Board Systems. Where textured surfaces exist, repairs will be done to match textures on adjacent areas.
- E. Areas where all existing coatings have been removed, creating a bare substrate, shall be spot primed with appropriate primer before full prime coat is applied.
- F. All new coatings will be applied according to manufacturer's directions, and will follow the Painting Schedule bellow.

3.3 PREPARATION

- A. Perform preparation and cleaning procedures in strict accordance with manufacturer's instructions for each substrate condition.
- B. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.
- C. Correct minor defects and clean surfaces that affect work of this Section.
- D. Shellac and seal marks which may bleed through surface finishes.
- E. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair.
- J. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer. The same day that cleaning has been performed.
- K. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- L. Plaster Surfaces: Fill hairline cracks, small holes and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

- M. Uncoated Steel and Iron Surfaces: Remove grease, scale, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- N. Shop Primed Steel Surfaces: Sand thoroughly and scrape to remove films, loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- O. Interior Wood Items Scheduled to Receive Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes, spot prime, cracks and other defects repairs when fully cured after primer has dried; sand between coats.
- P. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit and foreign matter. Seal knots, pitch streaks and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied.
- Q. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
- R. Thoroughly back paint all surfaces of exterior and interior finish lumber and millwork, including doors and window frames, trim, cabinet work, etc., that will be concealed after installation. Back paint items to be painted or enameled with the priming coat. Use a clear sealer for back priming where transparent finish is required.
- S. All drywall surfaces must be completely dry and dust free from decorating. Skim coated drywall must be sealed with an alkyd based sealer. Textured and non-textured drywall surfaces can be sealed with a waterborne sealer provided they are completely dry and dust free. Otherwise an alkyd-based sealer should be used.
- T. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.
- U. Metal frames and metal doors shall be re-primed with a rust inhibitor primer compatible with the shop primer and subsequent coats specified.

3.4 PROTECTION

- A. Protect pre-finished surfaces, lawns, shrubbery and adjacent surfaces surrounding the work of this Section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish sufficient drop cloths, shields, protective methods and equipment to prevent spray, splatter or droppings from disfiguring other surfaces.
- D. Remove empty paint containers from site.
- E. Protect surfaces, equipment, and fixtures from damage resulting from use of fixed, movable and hanging scaffolding, planking, and staging.
- F. Provide WET PAINT signs, barricades, and other devices required to protect newly finished surfaces. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.
- G. Mask off areas where necessary.

- H. Cover fixtures and remove hardware not to be painted.
- I. Replace hardware only when paint finishes are thoroughly dry.

3.5 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Brush applications:
 - 1. Brush out and work the brush coats onto the surface in an even film.
 - 2. Cloudiness, spotting, holidays, laps, brush marks, runs, sabs, ropiness and other surface imperfections will not be acceptable.
- C. Spray applications:
 - 1. Except as specifically otherwise approved by the Architect, confine spray application to metal framework and similar surfaces where hand brushing would be inferior.
 - 2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats. Back roll all sprayed applications with roller 90° to direction paint was applied.
 - 3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
- D. Use applicators and techniques best suited for the material and surfaces to which applied.
- E. The number of coats specified is the minimum that shall be applied. Apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.
- F. All undercoats shall be tinted slightly to approximate the color of the finish coat.
- G. Apply each material at not less than the manufacturer's recommended spreading rate:
- H. Provide a total dry film thickness of not less than 1.2 mils for each required coat.
- I. Apply prime coat to material that is required to be painted or finished.
- J. Finish exterior doors on tops, bottoms, and edges same as exterior faces, after fitting. Where opening into rooms having different finishes, finish door edges as directed.
- K. Do not apply finishes to surfaces that are not dry.
- L. Apply each coat to uniform finish.
- M. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- N. Sand lightly between coats to achieve required finish.
- O. Allow applied coat to dry before next coat is applied.
- P. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- Q. Prime back surfaces of interior and exterior woodwork with primer paint.

- R. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.
- S. Do not paint over rated labels or any ID label.

3.6 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Refer to Electrical and Mechanical Divisions for schedule of color-coding and identification banding of equipment, ductwork, piping and conduit.
- B. Paint shop primed equipment. Do not paint shop pre-finished items.
- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are pre-finished.
- E. Replace identification markings on mechanical or electrical equipment when painted accidentally.
- F. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- G. Paint exposed conduit and electrical equipment occurring in finished areas.
- H. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- I. Color code equipment, piping, conduit, and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows, names and numbering.
- J. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.

3.7 CLEANING

- A. As work proceeds, promptly and carefully remove paint where spills, splashes, spattering, spots and blemishes have occurred on surfaces throughout the project.
- B. During progress of work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.
- D. Upon completion of painting work remove all rubbish, paint cans, and accumulated materials resulting from work in each space or room. All areas shall be left in a clean, orderly condition.
- E. Runs, sags, misses, holidays, stains and other defects in the painted surfaces, including inadequate coverage and mil thickness shall be satisfactorily touched up, or refinished, or repainted as necessary.

3.8 SCHEDULE - EXTERIOR SURFACES

Dunn-Edwards

Frazee

Sherwin-Williams

1. Wood - Painted (Flat Acrylic)

1st coat: 42-1 EZPR00 E-Z Prime 168 PrimePlus
 2nd coat: SSSL10 SPARTASHIELD 203 Duratec
 3rd coat: SSSL10 SPARTASHIELD 203 Duratec

B51 Series Preprite ProBlock Primer
 A6 Series A-100 Flat
 A6 Series A-100 Flat

2. Wood - Painted (Semi-Gloss Acrylic)

1st coat: EZPR00 E-Z Prime 168 PrimePlus
 2nd coat: SSSL50 SPARTASHIELD 124 Mirro Glide SG
 3rd coat: SSSL50 SPARTASHIELD 124 Mirro Glide SG

B51 Series Preprite ProBlock Primer
 A76 Solo Acrylic SG
 A76 Solo Acrylic SG

3. Wood - Painted (Gloss Acrylic)

1st coat: SSSL50 SPARTASHIELD 168 Prime+Plus
 2nd coat: SSSL60 SPARTASHIELD 143 Mirro Glide GL
 3rd coat: SSSL60 SPARTASHIELD 143 Mirro Glide GL

B51 Series Preprite ProBlock Primer
 A77 Solo Acrylic GL
 A77 Solo Acrylic GL

4. Wood - Semi-Transparent

1st coat: "OKON" Weatherpro (Acrylic) 385 Madera (Oil)

A15T5 Woodscapes ST Stain

5. Stucco or Concrete (Flat Finish)

1st coat: W360 ENDURASEAL
 2nd coat: EDLV10 ENDURALASTIC 5
 3rd coat: EDLV10 ENDURALASTIC 5

Loxon Conditioner
 Conflex XL
 Conflex XL

6. Concrete Masonry Units (Flat Acrylic)

1st coat: MBPR00 Medium Blocfil Premi C302 Block Filler
 2nd coat: SSSL10 SPARTASHIELD 203 Duratec
 3rd coat: SSSL10 SPARTASHIELD 203 Duratec

B25W25 Preprite Block Filler
 A6 Series A-100 Flat
 A6 Series A-100 Flat

7. Steel - Primed or Unprimed (Flat Acrylic)

1st coat: Bloc-Rust Series BRPR00 C309 Acrylic Metal Primer
 2nd coat: SSSL10 SPARTASHIELD 203 Duratec
 3rd coat: SSSL10 SPARTASHIELD 203 Duratec

B66 ProCryl Acrylic Metal Primer
 A6 Series A-100 Flat
 A6 Series A-100 Flat

8. Steel - Primed or Unprimed (Semi-Gloss Acrylic)

1st coat: Bloc-Rust Series BRPR00 C309 Acrylic Metal Primer
 2nd coat: SSSL50 SPARTASHIELD 124 Mirro Glide SG
 3rd coat: SSSL50 SPARTASHIELD 124 Mirro Glide SG

B66 ProCryl Acrylic Metal Primer
 A76 Solo Acrylic SG
 A76 Solo Acrylic SG

9. Steel - Primed or Unprimed (Gloss Acrylic)

1st coat: Bloc-Rust Series BRPR00 C309 Acrylic Metal Primer
 2nd coat: SSSL60 SPARTASHIELD 143 Mirro Glide GL
 3rd coat: SSSL60 SPARTASHIELD 143 Mirro Glide GL

B66 ProCryl Acrylic Metal Primer
 A77 Solo Acrylic GL
 A77 Solo Acrylic GL

10. Steel - Galvanized (Flat-Acrylic)

1st coat: ULGM00 ULTRASHIELD Galvanized Primer C309 Acrylic Metal Primer

B66 ProCryl Acrylic Metal Primer

2nd coat: SSSL10 SPARTASHIELD	203 Duratec	A6 Series A-100 Flat
3rd coat: SSSL10 SPARTASHIELD	203 Duratec	A6 Series A-100 Flat

**11. Steel - Galvanized
(Semi-Gloss - Acrylic)**

1st coat: ULGM00 ULTRASHIELD Galvanized Primer	C309 Acrylic Metal Primer	B66 ProCryl Acrylic Metal Primer
2nd coat: SSSL50 SPARTASHIELD	124 Mirro Glide SG	A76 Solo Acrylic SG
3rd coat: SSSL50 SPARTASHIELD	124 Mirro Glide SG	A76 Solo Acrylic SG

**12. Steel I- Galvanized
(Gloss - Acrylic)**

1st coat: ULGM00 ULTRASHIELD Galvanized Primer	C309 Acrylic Metal Primer	B66 ProCryl Acrylic Metal Primer
2nd coat: SSSL60 SPARTASHIELD	143 Mirro Glide GL	A77 Solo Acrylic GL
3rd coat: SSSL60 SPARTASHIELD	143 Mirro Glide GL	A77 Solo Acrylic GL

3.9 SCHEDULE - INTERIOR SURFACES

Dunn-Edwards

Frazer

Sherwin-Williams

1. Wood – Painted

(Semi-Gloss Acrylic)

1st coat: BIPR00 BLOCK-IT Premium	168 PrimePlus	B51 Series Preprite ProBlock Primer
2nd coat: SZRO50 SPARTAZERO	124 Mirro Glide SG	A76 Solo Acrylic SG
3rd coat: SZRO50 SPARTAZERO	124 Mirro Glide SG	A76 Solo Acrylic SG

2. Wood - Painted (Gloss Acrylic)

1st coat: BIPR00 BLOCK-IT Premium	168 PrimePlus	B51 Series Preprite ProBlock Primer
2nd coat: SZRO50 SPARTAZERO	143 Mirro Glide GL	A77 Solo Acrylic GL
3rd coat: SZRO50 SPARTAZERO	143 Mirro Glide GL	A77 Solo Acrylic GL

**3. Glue-Laminated Wood and Wood
Timber Members**

(Stain-Flat Varnish)

1st coat: CC24XX Series Craftman Collection Oil Base Wiping Stain	685 Wood Stain	Minwax WB Stain
2nd coat: 550-0203 275 VOC Conversion Varnish clear Flat	6701 Satin (McCloskey)	Minwax Polycrylic Satin
3rd coat: 550-0203 275 VOC Conversion Varnish clear Flat	6701 Satin (McCloskey)	Minwax Polycrylic Satin

4. Wood – Transparent

(Stain - Semi-gloss Varnish)

1st coat: CC24XX Series Craftman Collection Oil Base Wiping Stain	685 Wood Stain	Minwax WB Stain
Filler Coat*: PWF 2703 Paste *Open Grain Wood Only	Jasco Filler	Minwax Paste Filler
2nd coat: 210-0240 Gemcoat 275 VOC Conversion Sealer	6200 Sealer (McCloskey)	Minwax Pre-Stain Conditioner
3rd coat: 550-201 275 VOC Conversion Varnish clear Semi-Gloss	6702 Semi-Gloss Varnish (McCloskey)	Minwax Polycrylic Semigloss

4th coat: 550-201 275 VOC Conversion Varnish clear Semi-Gloss	6702 Semi-Gloss Varnish (McCloskey)	MinwaxPolycrylic Semigloss
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**5. Wood – Transparent
(Stain - Semi-Gloss Lacquer)**

1st coat: CC24XX Series Craftman Collection Oil Base Wiping Stain	685 Wood Stain	49 Wood Classics
2nd coat: 200-0045 275 VOC Clear Lacquer Sealer	760 Sanding Sealer	T60FH27 Sanding Sealer
3rd coat: 500-0111 257 VOC Lacquer Clear Semi-Gloss	723 Semi-Gloss Lacquer	T70FH52 Semigloss Lacquer
4th coat: **	723 Semi-Gloss Lacquer	T70FH52 Semigloss Lacquer

**6. Concrete, Concrete Block,
Cement Plaster (Flat-Latex)**

1st coat: ESPR00 Eff-Stop Premium	168 PrimePlus	B51 Series Preprite ProBlock Primer
2nd coat: SZRO10 SPARTAZERO	002 Majestic	B30-2600 ProMar 200 Zero VOC Flat

**7. Concrete, Concrete Block,
Cement Plaster (Semi-Gloss-Latex)**

1st coat: ESPR00 Eff-Stop Premium	168 PrimePlus	B51 Series Preprite ProBlock Primer
2nd coat: SZRP50 SPARTAZERO	124 Mirro Glide SG	A76 Solo Acrylic SG
3rd coat: SZRO50 SPARTAZERO	124 Mirro Glide SG	A76 Solo Acrylic SG

**8. Steel - Primed or Unprimed
(Flat - Latex)**

1st coat: Bloc-Rust Series BRPR00	C309 Acrylic Metal Primer	B66 ProCryl Acrylic Metal Primer
2nd coat: SZRO10 SPARTAZERO	002 Majestic	B30-2600 ProMar 200 Zero VOC Flat
3rd coat: SZRO10 SPARTAZERO	002 Majestic	B30-2600 ProMar 200 Zero VOC Flat

**9. Steel - Primed or Unprimed
(Semigloss - Latex)**

1st coat: Bloc-Rust Series BRPR00	C309 Acrylic Metal Primer	B66 ProCryl Acrylic Metal Primer
2nd coat: SZRO50 SPATRAZERO	124 Mirro Glide SG	A76 Solo Acrylic SG
3rd coat: SZRO50 SPATRAZERO	124 Mirro Glide SG	A76 Solo Acrylic SG

**10. Steel - Primed or Unprimed
(Gloss Acrylic)**

1st coat: Bloc-Rust Series BRPR00	C309 Acrylic Metal Primer	B66 ProCryl Acrylic Metal Primer
2nd coat: SSSL60 SPARTASHIELD	143 Mirro Glide GL	A77 Solo Acrylic GL
3rd coat: SSSL60 SPARTASHIELD	143 Mirro Glide GL	A77 Solo Acrylic GL

**11. Steel - Galvanized and Aluminum
(Flat-Latex)**

1st coat: SCME-01 Metal Clean & Etch	Jasco Prep & Prime	GLL Clean n Etch
2nd coat: ULGM00 ULTRASHIELD Galvanized Primer	C309 Acrylic Metal Primer	B66 ProCryl Acrylic Metal Primer
3rd coat: SZRO10 SPARTAZERO	002 Majestic	B30-2600 ProMar 200 Zero VOC Flat
4th coat: SZRO10 SPARTAZERO	002 Majestic	B30-2600 ProMar 200 Zero VOC Flat

**12. Steel - Galvanized and Aluminum
(Semi-gloss-Latex)**

1st coat: SCME-01 Metal Clean & Etch	Jasco Prep & Prime	GLL Clean n Etch
2nd coat: ULGM00 ULTRASHIELD Galvanized Primer	C309 Acrylic Metal Primer	B66 ProCryl Acrylic Metal Primer
3rd coat: SZRO50 SPARTAZERO	124 Mirro Glide SG	A76 Solo Acrylic SG
4th coat: SZRO50 SPARTAZERO	124 Mirro Glide SG	A76 Solo Acrylic SG

13. Steel - Galvanized (Gloss Acrylic)

1st coat: SCME-01 Metal Clean & Etch	C309 Acrylic Metal Primer	B66 ProCryl Acrylic Metal Primer
2nd coat: ULGM00 ULTRASHIELD Galvanized Primer	143 Mirro Glide GL	A77 Solo Acrylic GL
3rd coat: SZRO60 SPARTAZERO	143 Mirro Glide GL	A77 Solo Acrylic GL
4th coat: SZRO60 SPARTAZERO		

**14. Plaster, Gypsum Board
(Flat Latex)**

1st coat: VNPL00 VINYLASTIC Premium	061 Aqua Seal	B28W8000 PVA Primer
2nd coat: SZRO10 SPARTAZERO	002 Majestic	B30-2600 ProMar 200 Zero VOC Flat
3rd coat: SZRO10 SPARTAZERO	002 Majestic	B30-2600 ProMar 200 Zero VOC Flat

**15. Plaster, Gypsum Board
(Eggshell Latex)**

1st coat: VNPL00 VINYLASTIC Premium	061 Aqua Seal	B28W8000 PVA Primer
2nd coat: SZRO30 SPARTAZERO	022 Lo Glo	B20-2600 ProMar 200 Zero VOC Eg-shel
3rd coat: SZRO30 SPARTAZERO	022 Lo Glo	B20-2600 ProMar 200 Zero VOC Eg-shel

**16. Plaster, Gypsum Board
(Gloss Acrylic)**

1st coat: VNPL00 VINYLASTIC Premium	061 Aqual seal	B28W8000 PVA Primer
2nd coat: SSSL30 SPARTASHIELD	143 Mirro Glide GL	A77 Solo Acrylic GL
3rd coat: SSSL30 SPARTASHIELD	143 Mirro Glide GL	A77 Solo Acrylic GL

END OF SECTION

SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. ES plastic signs.
- B. Acrylic panel signs.
- C. Site graphics.
- D. Metal letters and numbers.
- E. Cast metal plaques.

1.2 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Submit shop drawings listing sign styles, lettering and locations, spacing and installation method.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit two samples illustrating full size sample sign, of type, style and color specified including method of attachment.
- E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- F. Include installation templates and hardware.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and protect products under provisions of Section 01 70 00.
- B. Package signs, labeled in name groups.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesive mounted signs when ambient temperature is below 70 degrees F. Maintain this minimum during and after installation of signs.

1.5 REGULATORY REQUIREMENTS

- A. Conform to California Code of Regulations for installing work in conformance with signage for the physically disabled.
- B. All signage shall conform to CBC Sections 11B-703.
- C. Tactile exit signage shall be provided per CBC 1013.4.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acrylic Panel Signs:
 - 1. Mohawk Sign Systems, (518) 370-3433.
 - 2. A2Z Sign Company, (909) 949-4442
 - 3. Best Sign Systems, (800) 235-2378.
 - 4. ASI Sign Systems, (916) 924-1939.
 - 5. Substitutions: Under provisions of Section 01 60 00.

- B. Accessible and Traffic Signage:
 - 1. STOPSignsAndMore.com, (888) 931-1793.
 - 2. ADA Sign Depot, adasigndepot.com, (858) 385-9095.
 - 3. Myparkingsign.com, (800) 952-1457.

- C. Substitutions: Under provisions of Section 01 60 00. Metal Letters and Numbers:
 - 1. Gemini, (507) 263-3957.
 - 2. Nelson-Harkins Inc., (714) 946-9392.
 - 3. Vomar Products, Inc., (209) 276-9589.
 - 4. Substitutions: Under provisions of Section 01 33 00.

- D. Cast Metal Plaques:
 - 1. Lake Shore Markers, (800) 458-0463.
 - 2. Matthews, (800) 235-6574.
 - 3. Metallic Arts, Inc., (714) 925-7285.
 - 4. Substitutions: Under provisions of Section 01 33 00.

2.2 Accessories

- A. Provide all anchors, adhesives, and accessories for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts existing surfaces.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install true, plumb, level and adequately secured to substrate with tamper proof mechanical fasteners. Paint all exposed fasteners to match sign color.
- C. Clean and polish.

3.3 SIGN TYPES

- A. MP plastic - Series 200A SAND CARVED as manufactured by Mohawk Sign Systems or equal. Material shall be 1/4" thick hard phenolic ES plastic laminate. See plans for location. (Max. of 16 characters per sign)
1. International Symbol of Accessibility 6 X 6 w/c. Contractor shall also furnish directional arrows indicating the accessible path of travel to be visible to persons approaching pedestrian ways. Provide #M203-6 frame series.
 2. Room identification sign: 3-11/32" high with 1" high room name text and grade 2 Braille. Provide M202-X frame series. Note: California Contracted Grade 2 Braille shall be used wherever Braille symbols are shown. Dots shall be 1/10 inch (2.54 mm) on centers in each cell with 2/10 inch (5.08mm) space between cells. Dots shall be raised a minimum of 1/40 inch (0.635mm) above the background. Dots to be rounded or eased.
 3. Signage and graphics:
 - a. Raised characters shall comply with CBC Section 11B-703.2:
 - b. Depth: It shall be 1/32 inch minimum above their background and shall be sans serif uppercase and be duplicated in Braille.
 - c. Height: It shall be 5/8 inch minimum and 2 inches maximum based on the height of the uppercase letter "I". CBC Section 11B-703.2.5
 - d. Finish and contrast: Characters and their background shall have a non-glare finish. Character shall contrast with their background with either light characters on a dark background or dark characters on a light background. CBC Section IIB-703.5.1.
 - e. Proportions: It shall be selected from fonts where the width of the uppercase letter "O" is 60 3/4 minimum and 110 3/4 maximum of the height of the uppercase letter "I". Stroke thickness of the uppercase letter "I" shall be 15 3/4 maximum of the height of the character. CBC Sections IIB-703.2.4 and 11B-703.2.6
 - f. Character Spacing: Spacing between individual tactile characters shall comply with CBC Section 11B-703.2.7 and 11B-703.2.8
 - g. Format: Text shall be in a horizontal format. CBC Section 11B-703.2.9
 - h. Braille: It shall be contracted (Grade 2) and shall comply with CBC Sections IIB-703.3 and 11B-703.4. Braille dots shall have a domed or rounded shape and shall comply with CBC Table and Figure 11B-703.3.1.
 - i. Mounting height: A tactile sign shall be located 48" minimum to the baseline of the lowest Braille cells and 60" maximum to the baseline of the highest line of raised characters above the finish floor or ground surface.
 - j. Mounting location: A tactile sign shall be located per CBC Section and Figure 11B -703.4.2 as follows:
 - 1) Alongside a single door at the latch side.
 - 2) On the inactive leaf at double doors with one active leaf.
 - 3) To the right of the right hand door at double doors with two active leaves.
 - 4) On the nearest adjacent wall where there is no wall space at the latch side of a single door or at the right side of double doors with two active leaves.

- 5) So that a clear floor space of 18" x18" minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.
 - k. Visual characters shall comply with CBC Section 11B-703.5 and shall be 40" minimum above finish floor or ground..
 - l. Pictograms shall comply with CBC Section IIB-703.6.
 - m. Symbol of accessibility shall comply with CBC Section 11B-703.7.
 - n. Variable message signs shall comply with CBC Section 11B-703.8.
- B. Acrylic Signs: Series 200 with 1/4" thick dimensional letters as manufactured by Mohawk Sign Systems or equal. Chemically welded to colored acrylic. See plans for location.
- 1. Restroom Identification Signs: circle or triangle with ambulatory figure and international symbol of accessibility. Similar to "Mohawk" MCA-VM-3, MCA-UM-4 and unisex. See plans for location and gender designation.
- C. Site Graphics: Minimum .063" aluminum with 3M Engineer Grade Prismatic Reflective Sheeting, 3M Inks, and 3M Protective Overlay Film (POF).
- 1. Parking Stall: 8" X 10" international symbol of accessibility, post one sign at every stall per detail on drawings.
 - 2. Driveway Entrance: 17" X 22" (minimum) tow-away sign with local towing address and phone number of enforcement. Post one sign at each drive entrance per detail on drawings.
 - 3. Gate Access Sign: 18" X 24" sign to read "Gates to Remain Locked in the Open Position During School Hours" with 1" all capitalized text. Post one per gate entrance. See site plan on drawings.
- D. Metal letters and Numbers: Prismatic cast baked enamel satin finish as manufactured by Gemini, Inc. Submit (4) copies of fabrication drawings and one full size paper template for architects review prior to fabrication. Individual letters to be projected mounted with spacers and threaded studs set in epoxy adhesive. Allow for a minimum of 40 12" high letters and 20 8" high letters. Color as selected by Architect for manufacturer's full color line.
- E. Cast Metal Plaques: Cast Bronze, Satin Finish.
- 1. Dedication Plaque: 24 x 36 x 1" thick, cast bronze with sculptured finish at all fields and smooth flat finish at all borders, text and graphics. Layout and location as provided by Architect.

END OF SECTION

SECTION 10 21 15

PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Floor mounted solid plastic toilet partitions.
- B. Urinal screens.
- C. Attached hardware.

1.2 REFERENCES

- A. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Submit shop drawings indicating partition layout and dimensions, panel and door sizes, door swings, elevations, anchorage and mounting details, and finishes.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit three samples 6 x 6 inch in size illustrating panel colors.
- E. Provide a sample of each type of hardware.

1.4 REGULATORY REQUIREMENTS

- A. Conform to Title 24 of the California Administrative Code.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements are the same as shown on shop drawings.

PART 2 PRODUCTS

2.1 MANUFACTURES

- A. Comtec Industries, (800) 445-5148.
- B. PSISC, (866) 337-7286.
- C. Weis/Robart, (714) 666-0822.
- D. Substitutions: Under provisions of Section 01 60 00.

2.2 MATERIALS

- A. Solid Plastic: High density, solid polyethylene with homogeneous color throughout. Provide material not less than 1-inch thick, seamless construction with edges eased.

2.3 ACCESSORIES

- A. Pilaster Shoe: ASTM A167, Type 304 stainless steel, 3 inch high with adjustable screw jack.
- B. Attachments, Screws, and Bolts: Stainless steel, theft proof type, heavy-duty extruded aluminum brackets.
- C. Through Bolts and Nuts: Stainless steel with tamperproof heads.
- D. Continuous stainless steel strip at bottom edge of panel partitions.
- E. Ceiling attachment.

2.4 HARDWARE

- A. Hinges: Continuous, stainless steel, self closing gravity hinges, adjustable for door close positioning, equivalent to Capitol #605.
- B. Latch and Keeper: Stainless steel slide latch, door strike and keeper with rubber bumper.
- C. Coat Hook: Stainless steel hook with rubber bumper tip mount at 48" AFF at accessible compartment.
- D. Wall Brackets: Full length, continuous stainless steel wall brackets.
- E. Accessible Compartment: Hand activated slide bolt latch at + 36" above finish floor.
- F. Door Pulls: Stainless steel, "U" shaped door pulls, equivalent to Capitol #356. Install each side of accessible compartment at 34" - 44". Locate directly beneath latch.
- G. Panel Brace: Stainless steel full height "T" brace where required to limit panel deflection.

2.5 FABRICATION

- A. Fabricate components of 1 inch thick high density polyethylene polymer. Flame spread of 25.
- B. Doors and Panels: 1 inch thick x 55 inch high, high density polyethylene polymer. Stainless steel edging strips shall be fastened to the bottom edge of all panels, full length.
- C. Pilasters: 1 inch thick, constructed same as doors, of sizes required to suit cubicle width and spacing. Stainless steel edging strips shall be fastened to the bottom edge of all pilasters full length.
- D. Pilaster Shoes: Made from polymer resin formed under high pressure and be made of single construction with color throughout.
- E. Door, Panels and Pilasters: 1 inch thick and all edges machined to a radius of .250 inches and all exposed edges to be free of saw marks.
- F. All alternate partition manufacturers products shall have a homogeneous color throughout.

- G. Furnish units with cutouts and drilled holes to receive partition mounted hardware, accessories, and grab bars as indicated.
- H. Accessible Toilet Compartments:
 - 1. Wheelchair accessible compartment shall comply with CBC Section 11B-604.8.1.
 - 2. Toe clearance for at least one side partition of a wheelchair accessible compartment shall comply with CBC Section and Figure 11B-604.8.1.4. It shall be 9" high minimum above the finish floor and 6" deep minimum beyond the compartment side face of the partition, exclusive of partition support members. It shall be 12" high minimum above the finish floor for children's use. Partition components at toe clearances shall be smooth without sharp edges or abrasive surfaces. Toe clearance at the side partition is not required in a compartment greater than 66" wide.
 - 3. An ambulatory accessible compartment shall be provided where there are six or more toilet compartments, or where the combination of urinals and water closets totals six or more per CBC Section 11B-213.3.1. Such compartment shall comply with CBC Section 11B-604.8.2.
 - 4. Door and door hardware for accessible compartments shall be self-closing and shall comply with CBC Section 11B-404 except that pull-side clearance for ambulatory accessible compartments shall be minimum 44" clear, rather than 60". CBC Figure 11B-604.8.2.
 - 5. A door pull complying with CBC Section 11B-404.2.7 shall be placed on both sides of the door near the latch.
 - 6. Doors shall not swing into clear floor space or clearance required for any fixtures .

2.6 FINISHES

- A. Plastic Panels: Color shall be selected from manufacturer's full range of standard and custom colors, with a maximum of two colors as selected by Architect.
- B. Stainless Steel Surfaces: No. 4 finish.
- C. Exposed Steel Surfaces: Satin chrome plated.
- D. Aluminum: Anodized to color as selected.
- E. Non-ferrous Surfaces: Satin chrome plated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that openings are ready to receive work.
- B. Verify field measurements are as shown on shop drawings.
- C. Verify correct location of built-in framing, anchorage, bracing, and plumbing fixtures.
- D. Beginning of installation means installer accepts existing conditions.
- E. Door at front entry stalls shall have 32" minimum clear width when the door is open 90°.
- F. Door at side entry stalls shall have 34" minimum clear width when the door is open 90°.

3.2 ERECTION

- A. Erect in accordance with manufacturer's instructions.
- B. Install partition components secure, plumb and level.
- C. Attached panel brackets securely to walls, ceilings and floors using appropriate anchor devices.
- D. Attach panels and pilasters to brackets with through bolts and nuts.
- E. Provide 1/2-inch space between wall surface and panels or pilasters.
- F. Provide for adjustment of floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.
- G. Support pilasters from above ceiling framing using two adjustable hanging studs to provide vertical leveling. Conceal ceiling fastenings with pilaster shoes.
- H. Equip each toilet stall door with continuous hinge, and door latch.
- I. Install door strike keeper in each pilaster in alignment with door latch.
- J. Equip each toilet stall door with one bumper.

3.3 ERECTION TOLERANCES

- A. Maximum Variation from Plumb or Level: 1/8 inch.
- B. Maximum Misplacement from Intended Position: 1/8 inch.
- C. Secure panel screens so as not to exceed panel deflection of 1/4" in all locations.

3.4 ADJUSTING

- A. Adjust work under provisions of Section 01 70 00.
- B. Adjust and align door hardware to uniform clearance at vertical edges of doors. Clearance space not to exceed 3/16 inch.
- C. Adjust door hinges so that free movement is attained and will locate in-swing doors in partial open position when unlatched. Return out-swinging doors to closed position.

3.5 CLEANING

- A. Clean work under provisions of Section 01 70 00.
- B. Remove protective coverings.
- C. Clean surfaces and hardware.

END OF SECTION

SECTION 10 28 00

TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes toilet and washroom accessories, framed mirror units, concealed anchor devices and backing plate reinforcements furnished by other Sections; attachment hardware; and utility room accessories.
- B. Related Sections:
 - 1. Section 06 10 00 - Rough Carpentry: In-wall framing and plates for support of accessories.
 - 2. Section 10 21 15 - Plastic Toilet Compartments.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A123/A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 2. ASTM A153/A153M – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 3. ASTM A167 – Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - 4. ASTM A269 – Standard Specifications for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - 5. ASTM A366 – Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
 - 6. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 7. ASTM A666 – Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - 8. ASTM B456 – Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - 9. ASTM C1036 – Standard Specification for Flat Glass.
- B. Federal Specification Unit
 - 1. FS A-A-3002 – Mirrors, Glass.
- C. 2022 California Building Code, Chapter 11B.

1.3 REGULATORY REQUIREMENTS

- A. Conform to 2022 California Building Code for installing work in conformance with equipment for persons with disabilities.
- B. Toilet accessories required to be accessible shall be mounted at heights according to CBC Section 11B-602 to 612.
- C. Toilet paper and feminine napkin disposal located on the grab bar side of an accessible toilet room or stall shall not be located closer than 1-1/2” clear of the tangent point of the grab bar.

- D. Grab bars in toilet facilities and bathing facilities shall comply with CBC Section 11B-609. Grab bars and any wall or other surfaces adjacent to grab bars shall be free of sharp or abrasive elements and shall have rounded edges. The space around the grab bars shall be as follows:
 - 1. 1½” between the grab bar and wall.
 - 2. 1½” minimum between the grab bar and projecting objects below and at the ends.
 - 3. 12” minimum between the grab bar and projecting objects above.

1.4 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures: Submittal procedures.
- B. Product Data: Provide manufacturer’s product data on accessories describing size, finish, details of function, and attachment methods.
- C. Samples: Submit one sample, if requested, of each item and model specified, illustrating color and finish. If approved, sample may be incorporated into project.
- D. Manufacturer’s installation instructions: Submit manufacturer’s installation instructions under provisions of Section 01 33 00.
- E. Submit maintenance and operation instructions and keys required for each type of equipment and lock.
- F. Supply a material list with quantities.

1.5 QUALITY ASSURANCE

- A. Manufacturers: Model numbers are for washroom accessories manufactured by Bobrick Washroom Equipment, Inc. and are listed as a standard of quality. Equivalent products of other manufacturers may be acceptable, if, in the judgment of the Architect, they meet the intent of the specification in terms of design, function, materials, and quality of workmanship.
- B. Accessories shall be products of a single manufacturer.

1.6 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver items in manufacturer’s original unopened protective packaging.
- B. Store material in original protective packaging to prevent soiling, physical damage, or wetting.
- C. Handle so as to prevent damage to finished surfaces.
- D. Maintain protective covers on units until installation is complete. Remove covers at final cleanup of installation.

1.8 GUARANTEE

- A. Mirrors shall be guaranteed 15 years against silver spoilage. Accessories shall be guaranteed to be free from defects in workmanship and material for a period of one year from Certificate of Completion.

PART 2 PRODUCTS

2.1 TOILET AND BATH ACCESSORIES

- A. Manufacturers:
 - 1. Bobrick Washroom Equipment, Inc. (818) 764-1000.
 - 2. Bradley Corporation, (714) 770-1001.
 - 3. McKinney/Parker, (213) 945-1431.
 - 4. Substitutions: Under provisions of Section 01 60 00.

2.2 COMPONENTS

- A. Accessories – General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Furnish two keys for each accessory to Owner, master key all accessories, with exception of coin receiving boxes on vending equipment.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269, stainless steel.
- E. Galvanized Sheet Steel: ASTM A653, G90 zinc coating.
- F. Mirror Glass: Float glass, Type I, Class I, Quality q2 (ASTM C 1036), with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with FS A-A-3002.
- G. Adhesive: Two component epoxy type, water proof.
- H. Fasteners, Screws and Bolts: Hot dip galvanized, tamperproof.
- I. Expansion Shields: Fiber, lead or rubber as recommended by accessory manufacturer for component and substrate.

2.3 TOILET ROOM ACCESSORIES

- A. Toilet Paper Dispenser:
 - 1. At non-accessible stalls, dispensers are supplied by District, to be picked up and installed by Contractor. One per stall.
 - 2. At accessible stalls, dispenser shall be provided and installed by Contractor:
 - a. B-3888 - Recessed Multi-Roll Toilet Tissue Dispenser
- B. Surface Mounted Soap Dispenser: B-2111 - Surface Mounted Soap Dispenser.
- C. Mirrors

1. Mirror with stainless steel frame: B-2908 - Mirror (Staff)
 2. Frameless stainless steel mirror: B-1556 Mirror (Student)
- D. Seat Cover Dispenser:
1. At non-accessible stalls, dispensers are supplied by District, to be picked up and installed by Contractor. One per stall.
 2. At accessible stalls, dispenser: B-301 - Stainless Steel Recessed Seat Cover Dispenser
- E. Grab Bars: Stainless steel, 1-1/2 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting with snap flange cover; 1-1/2 inches clearance between wall and inside of grab bar. See Drawings for locations.
1. 48 inch length: Bobrick Model B-5806.99x48.
 2. 42 inch length: Bobrick Model B-5806.99x42.
 3. 36 inches length: Bobrick Model B-5806.99x36.
 4. 24 inches length: Bobrick Model B-5806.99x24.
 5. 18 inches length: Bobrick Model B-5806.99x18.
 6. 24" x 36" L-Shape: Bobrick Model B-58616.
- F. Hand Dryer: Surface mount, 4" maximum projection for face of wall surface. Model: Dyson Airblade V
- G. Recessed Sanitary Napkin Disposal
1. At non-accessible stalls, dispensers are supplied by District, to be picked up and installed by Contractor. One per stall.
 2. At accessible stalls, dispenser: B-353 - Recessed Sanitary Napkin Disposal
- H. Recessed sanitary napkin/tampon vendor: B-3706

2.4 UTILITY ROOM ACCESSORIES

- A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
1. Holders: 4 spring-loaded rubber cam holders.
 2. Length: 36 inches.
 3. Product: Bobrick Model B-224X36.

2.5 FACTORY FINISHING

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.
- B. Chrome/Nickel Plating: ASTM B456, Type SC2, satin finish, unless otherwise noted.
- C. Baked Enamel: Pre-treat to clean condition, apply one coat primer and minimum two coats electrostatic baked enamel.
- D. Galvanizing for Items other than Sheet: ASTM A123/A123M; minimum 1.25 oz/sq. ft. coating thickness; galvanize after fabrication.
- E. Galvanizing for Nuts, Bolts and Washers: ASTM A153/A153M.
- F. Shop Primed Ferrous Metals: Pre-treat and clean, spray apply one coat primer and bake.
- G. Back paint components where contact is made with building finishes to prevent electrolysis.

2.6 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints.
- C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- D. Shop-assemble components and package complete with anchors and fittings.
- E. Provide steel anchor plates, adapters and anchor components for installation.
- F. Hot-dip galvanize exposed and painted ferrous metal and fastening devices.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.
- B. Verify exact location of accessories for installation.
- C. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.
- D. Check walls for correct dimensions, plumbness of blocking or frames, recess size in masonry, and other preparation that would affect installation of accessories.
- E. Coordinate the work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.
- F. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location and quantity of accessories for installation.

3.3 INSTALLATION

- A. Toilet accessories required to be accessible shall be mounted at heights according to CBC Section 11B-602 to 612.
- B. Toilet paper and feminine napkin disposal located on the grab bar side of an accessible toilet room or stall shall not be located closer than 1-1/2" clear of the tangent point of the grab bar.
- C. Install fixtures, accessories and items in accordance with manufacturer's instructions.
- D. Install plumb and level, securely and rigidly anchored to substrate.
- E. Conceal evidence of drilling, cutting, and fitting on adjacent finishes.

- F. Fit flanges of accessories snug to wall surfaces. Provide for caulking in gaps between 90-degree return flanges and finish wall surface after accessories are installed.
- G. Install anchor system per contract drawings for grab bars.
- H. Install toilet accessories where indicated on Drawings.

3.4 ADJUSTING

- A. Adjust accessories for proper operation.

3.5 CLEANING

- A. Clean and polish exposed surfaces prior to final inspection.

3.6 SCHEDULE

- A. For locations, see Drawings.

END OF SECTION

SECTION 10 41 16

EMERGENCY KEY CABINETS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Emergency key cabinets and related mounting hardware.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on cabinet size and construction.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

PART 2 PRODUCTS

2.1 Emergency Key Cabinets

- A. Manufacturers:
 - 1. Knox Company, (800) 552-5669, 3200 Series.
 - 2. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

- A. Cabinet shall be extra heavy duty, recessed mount with lift-off door, without tamper switches. Provide a total of (6) six locations to be determined in the field by the local fire district. Application shall be obtained from local fire authority.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions and as indicated on the drawings.
- B. Furnish all necessary hardware, anchors, inserts, connections, and embedded items necessary for proper installation. Coordinate with work of other Sections.

3.3 CLEANING

- A. After completion, clean up and remove resultant debris from the site. Keep area clean during entire operation and leave spaces broom clean.

3.4 PROTECTION

- A. Protect Work under this Section from damage during course of construction.

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.2 REFERENCES

- A. NFPA 10 – Standard for portable fire extinguishers
- B. Title 19, California Code of Regulations, Chapter 3.

1.3 QUALITY ASSURANCE

- A. NFPA 10 – Standard for portable fire extinguishers

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Include physical dimensions, operational features, color and finish, wall mounting brackets with mounted measurements, anchorage details, rough-in measurements, location and details.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit manufacturer's operation and maintenance data under provisions of Section 01 70 00.
- B. Include test, refill or recharge schedules, procedures, and re-certification requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install extinguishers when ambient temperatures may cause freezing.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. J.L. Industries, (213) 582-2732.
- B. Potter-Roemer, Inc., (213) 404-3753.
- C. Watrous, Inc., (800) 323-2265.

D. Substitutions: Under provisions of Section 01 33 00.

2.2 EXTINGUISHERS

A. Dry Chemical Type: Equivalent to J.L. Industries, Cosmic 10E; class 4A-80BC.

2.3 CABINETS

A. Recessed cabinet equivalent to J.L. Industries, Cosmopolitan Model, fully recessed.

B. Provide fire rated cabinets as required to meet requirements of rated assemblies when installed in rated walls, see drawings.

2.4 FABRICATION

A. Form body of cabinet with tight inside corners and seams.

B. Pre-drill holes for anchorage.

C. Form perimeter trim by welding, filling and grinding smooth.

D. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon catch.

E. Glaze doors with resilient channel gasket glazing.

2.5 FINISHES

A. Extinguisher: Red enamel.

B. Cabinet Trim and Door: Type 304 with No. 4 finish. Electrostatic white enamel.

PART 3 EXECUTION

3.1 INSPECTION

A. Verify rough openings for cabinet are correctly sized and located.

B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

A. Install cabinets plumb and level in wall openings.

B. Secure rigidly in place in accordance with manufacturer's instructions.

C. Mount so that extinguisher handles are 48" A.F.F.

D. Fire extinguisher cabinets must comply with CBC Sections 11B-307, 11B-308, 11B-309, and 11B-403.

3.3 SCHEDULE

A. Provide 4A-80BC type fire extinguishers at all locations where shown on drawings (F.E.C.).

END OF SECTION

SECTION 11 31 00

RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes residential appliances as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Section 06 41 16 - Plastic-Laminate-Clad Architectural Cabinets: Contiguous cabinet construction.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Provide materials list of items proposed to be provided.
- C. Submit shop drawing and catalog cuts of items to be provided. Manufacturer or producer's standard drawings and technical information may be acceptable where complete enough to determine acceptability.
- D. Product Data: Submit data sufficient to demonstrate compliance with specifications and drawing requirements.
- E. Submit samples of products and materials where options of color, finish, pattern, or texture exist.
- F. Submit manufacturer's installation instructions for all items specified.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit operating data and periodic maintenance requirement schedules for specified equipment.

1.4 QUALITY ASSURANCE

- A. Products and materials to be provided are to be from manufacturers and producers regularly engaged full-time in the manufacture or production of this and similar items, with a history of successful manufacture or production acceptable to the Owner.
- B. In addition to complying with pertinent codes and regulations, comply with industry and trade standards normally associated with this product or material, except where specified product or material is superior in quality to industry and trade standards.
- C. For seismic protection, see Section 11 40 00.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

- B. Store products clear of floor in manner to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Products shall be provided by a single manufacturer, to the greatest extent possible. Drawings and specifications are based on appliances manufactured by General Electric Company and Amana, as approved by Architect, may be provided (model numbers listed are General Electric):
 1. Washer: G.E. Model WSXH208AWW. Front load (top load not allowed).
 2. Electric Dryer: G.E. Model DWSR483EBWW. Door shall be side opening (pull down not allowed).
 3. Substitutions: Under provisions of Section 01 33 00.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install equipment in strict accordance with manufacturer's printed installation instructions and according to details of the Drawings.
- B. Use anchoring devices appropriate for equipment and expected usage.

3.2 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Remove masking or protective covering from stainless steel and other finished surfaces.
- C. Wash and clean equipment.
- D. Polish glass, plastic, hardware, accessories, fixtures, and fittings.
- E. After completion, clean up and remove resultant debris from the site. Keep areas clean during entire operation and leave spaces broom clean.

3.3 DEMONSTRATION AND TRAINING

- A. Test equipment prior to demonstration. Demonstrate operation of components scheduled.

3.4 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.
- B. Remove protective coverings from prefinished work.

3.5 SCHEDULE

1. See Drawings for equipment locations.

END OF SECTION

SECTION 11 66 23
GYMNASIUM EQUIPMENT

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Basketball backstops, goals, hoists, and accessories.
- B. Volleyball floor sleeves, standards, nets and accessories.
- C. Power-touch equipment controller.
- D. Hi-Impact wall padding.

1.2 RELATED SECTIONS

- A. Ceiling System and Structural Steel.
- B. Gymnasium Flooring.
- C. Concrete.
- D. Electrical supply, conduit and final connections.
- E. Finish painting.

1.3 REFERENCES

- A. All equipment specified herein shall conform to the latest rules and regulations of the National Collegiate Athletic Association.

1.4 SUBMITTALS

- A. Provide material list of items proposed to be provided.
- B. Submit data sufficient to demonstrate compliance with specifications and drawing requirements.
- C. Submit shop drawings and catalog cuts of items to be provided. Manufacturer or producer's standard drawings and technical information may be acceptable where complete enough to determine acceptability.
- D. Submit samples of products and materials where options of color, finish, pattern or texture exist.
- E. Submit copy of manufacturers Certificate of Insurance.

1.5 WARRANTY

- A. Provide a one year warranty against defects in materials and workmanship.
- B. Provide additional guarantees as noted in the specifications.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. The gymnasium equipment specified, in order to establish a basis of design, performance and quality, is based on products manufactured by Porter Athletic Equipment Co., 2500 South 25th Ave., Broadview, Illinois 60153 (Phones: 708-338-2000 / 909-989-4317/ 909-592-3423). All provisions of the specifications must be complied with before fabrication and/or delivery.
- B. Other manufacturers desiring consideration are invited to bid provided they submit to the Architect complete specifications, cuts, descriptions, detailed list of similar installations of the proposed materials for proper evaluation prior to ten (10) days before Bid Date. The Architect will grant approval, if acceptable, by addendum to all contractors/bidders.
- C. The approval of other manufacturer's names and product numbers do not relieve the contractor from furnishing products which comply with all of the detailed requirements of these specifications.
- D. Manufacturer's products shall be standard cataloged items and shall be a consistently offered line of equipment. Manufacturers published literature must clearly show that the products being furnished are in compliance with these specifications. Otherwise, a detail listing of differences is required prior to bid.
- E. Manufacturers with at least 5 years of experience producing equipment of the type and design specified. Manufacturer must be able to furnish a reference list of recent projects with products in compliance with these specifications.

2.2 BASKETBALL

- A. Provide at the Main Center Court (one pair) and each Side Practice Courts (2 pairs): Model #219-R10 Wall Mounted Up-fold Backstops. Backstop shall be wall mounted up-fold type with face of backboard extended 8'-9" (Practice Courts) & 7'-4" (Main Court) from supporting wall.

Extension frames shall be fabricated of four (4) 1-7/8" O.D. tubes with a telescoping end section for ease of installation, and precise plumbing and alignment of backboard with official court markings, even when supported on uneven wall conditions. Ends of extension frame assemblies shall be drilled and bolted to fabricated steel hinge plates for attachment to the backside of the backboard and to the wall pads. The hinge plate assemblies shall be offset-type to allow backstop to be folded in an almost vertical storage position against the wall.

- B. Provide each Court: Provide #219 wall mounted backstop with #204 rectangular glass backboard. Backboard shall be 3'-6" x 6'-0" to meet all NCAA and NFHSA requirements. Backboard frame shall be of a welded, unitized construction fabricated from heavy wall rectangular steel tubing aluminum-faced for professional appearance. Unitized frame shall include a vertical center strut with a unique spacer sleeve arrangement at the upper two goal mount hole locations to transmit undue loading during slam-dunks, etc. directly through the glass and into the rear frame.

Unitized frame shall be designed to allow the bottom two goal mount holes to pass beneath the glass section to further alleviate stress on the glass. Backboard frame shall be furnished with heavy steel gusset plates in each corner incorporating keyhole slots for mounting the backboard to support structures at standard mounting centers. Rear backboard frame shall be finished in a durable neutral gray powder coat finish.

Glass shall be provided in 1/2" thick, fully tempered (heat-treated) glass section with uniform load and impact strength. Official white border and target area is "fired in" permanently on front side of

glass section so that it cannot wear away. Glass section shall be secured to unitized rear frame by means of an attractive, L-shaped brushed aluminum extrusion for optimum durability. Front perimeter frame shall be secured to unitized rear frame with structural truss head rivets. Glass section shall be fitted with shock absorbing neoprene material to cushion and protect the glass section. Goal mounting holes (4) to be on standard 5" (horizontal) x 4-1/2" (vertical) mounting centers (for use with Porter Model No. 245-500 goal. Each backboard to have a #326 official 2" thick edge bolt on padding. Backboard to have lifetime warranty when used with center strut.

- C. Backstop shall be horizontally braced with two (2) 3/16" x 1-1/4" steel tension flats attached at both ends with precision die-formed clamps and joined at their intersection with a bolted steel fitting. Two (2) chain supports (3/16" proof coil chain) shall extend diagonally from the wall to the upper extension tubes, terminating in clamp-type fittings.

Southern yellow pine wall pads shall be provided at all wall attachment points at extension frames and chain supports. All edges shall be chamfered and pads shall be finished with two finish coats of natural gloss lacquer.

Winch shall be Model No. 706 1/2 HP electric winch. Winch shall be worm gear type, designed to hold unit at any position when raising or lowering backstop. Handle shall be removable and shall provide sufficient leverage to facilitate easy raising of the backstop. Winch drum and gears shall be fully enclosed with a plated steel cover. Hoisting cable shall be 1/4" diameter galvanized aircraft cable, operating through 4" diameter pulleys enroute to the winch.

All metal parts shall be painted one (1) coat of flat black enamel.

- D. Each backstop shall be equipped with a #245-500 Ultra Breakaway Elite Goal. Goal shall incorporate a positive lock, pressure release mechanism which is preset to provide rebound characteristics identical to those of a non-movable ring. Static-load pressure release mechanism shall be field adjustable without removing the cover plate. After release and with the load no longer applied, the ring shall return automatically and instantaneously to the original, playing condition.

Rim shall be fabricated from 5/8" diameter cold drawn alloy steel, round formed to an 18" inside diameter ring. Inside diameter of ring shall be positioned 6" from face of backboard by a heavy formed steel, hinged type housing with a removable cover to conceal mounting bolts and spring mechanisms of goal, and also protect against finger entrapment. Goal mounting plate shall be provided with hardware and a 5" x 4" mounting hole pattern for front mounting on standard glass, wood and fiberglass type backboards and is also compatible for use with all Center-Strut direct mount type support frames.

Rim shall be provided with a unique "tube-tie" net attachment system to eliminate the conventional wire-formed type net locks for additional player safety. Rim shall be rigidly braced by means of a formed steel brace welded in position on the underside of the rim for maximum support. Rim shall be provided with a unique "tube-tie" net attachment system to eliminate the conventional wire-formed type net locks for additional player safety.

245-500 goal furnished with a 5-year limited warranty.

- E. Provide for each Court: backstop a #10797-120 "Saf-Strap Lock shall be inertia sensitive to automatically lock a basketball position at any time in storage or during the raising or lowering, sudden surge of speed created by a possible malfunction of the hoist apparatus. Unit shall incorporate a fully automatic reset requiring no ropes, levers or buttons.
- F. Backstop manufacturer to provide all backstop steel superstructure.

2.3 VOLLEYBALL (1 SET) OF COMPETITION COURTS

- A. Provide Porter #00872-200 floor sleeve system. Sleeve shall be cast in concrete footing. Sleeve shall be 3-3/4" O.D. heavy-wall steel tubing extending 9" into the footing. Top of sleeve to be installed 1/2" below finished floor elevation. Cover plate shall consist of an 8" O.D. recessed collar, cork gasket and chrome-plated cover. A swivel retainer pin in the collar shall permit cover to swivel and prevent theft. Special cover removal key to be included.
- B. Provide Porter #01991-000 Powr-Line® competition volleyball system. The standards shall be telescoping type that does not exceed above the net and impede the official's vision. Standards shall be constructed of 3-1/2" diameter 6063T6 type aluminum extrusion and finished with plastic molded foot to protect against gym floor damage. Upper portion of the telescoping standard shall have a special rectangular configuration to eliminate rotation and be extruded from the same aluminum alloy as the bottom portion of the standard. Upper end of the standard shall be equipped with an integral 2-1/3" diameter steel pulley to reduce cable drag and unnecessary tension. Upper telescoping portion of the standard shall be micro-adjustable for net heights from 6'-1" to 7'-11-5/8" by means of a special pressure locking T-handle mechanism. Telescoping standard shall be internally counterbalanced to reduce the possibility of the standard accidentally falling or causing finger injuries while making height adjustments. Bottom of standard and telescoping portion of standard shall be finished with a durable clear anodized finish. Standards shall be equipped with a tensioning winch (Powr Winch®) self-locking ratchet mechanism with a compression, disc-brake type release mechanism to eliminate the danger of suddenly released cable tension when removing a net. Powr Winch® shall be furnished with a 1-3/4" wide high-tensile nylon strap and durable snap hook. Powr Winch® shall be furnished complete with a removable handle to prevent unauthorized use. Standards shall include height-marking labels for ease in set-up. Weight of each standard shall not exceed 41 pounds for the reel post and 37 pounds for the end standard. This system shall meet USAV, NCAA, NFSHSA and NAGWS requirements.
- C. Provide Porter #02295-420 volleyball net. Net shall be 32' x 39" with a 42'-6" top cable. The end hems shall be 6" wide to allow for durability and strength. Each end hem shall be equipped with three 1" wide polypropylene tensioning straps and 1/2" fiberglass dowels.
- D. Provide each net with set of Porter #02296-100 Powr-Line® net antenna with clamp. Net antenna shall incorporate the antenna clamps. As one complete unit, the clamps shall secure easily and without the aid of a chair or stepladder. Net antenna shall be 3/8" x 6' long fiberglass dowels. Antenna shall be alternately marked red and white.
- E. Provide Porter # 00999-000 judge's platform. (Provide 2 only) Shall be constructed of 1-5/8" O.D. steel tube for handrail/ladder section. Provide three (3) formed ladder rung sections for ease of mounting to the platform. Provide 3/4" thick birch laminate platform reinforced with a hardwood understructure. Provide two (2) 3" diameter, non-marking casters positioned for ease of transporting. All metal parts shall be finished in a durable powder coat. Provide adjustable 3" diameter rubber feet on base of ladder.
- F. Provide Porter #00993-100 protective padding to protect platform and upper support racing and ladder frame. Ladder upright and front railing pads consist of 2-7/8" O.D. shock absorbing polyethylene foam with polyester reinforced vinyl cover, Velcro attached.
- G. Provide Porter #00839-000 protective padding. Padding shall extend to a height of 6' and shall meet all the latest requirements of USAV, NFHS, NCAA and NAGWS. The pads shall be constructed of firm, 1-1/4" thick Ethafoam® filler and covered in durable vinyl reinforced cover material. The courtside portion of each pad shall be furnished with a 2" x 29" opening at the top inside for attaching the pad after the net has been installed and properly height adjusted and tensioned.

- H. Provide Porter #00956-100 Volleyball Storage/Transport system. Heavy-duty steel transport frame shall be designed to store and transport six sleeve-type volleyball standards, one judge's stand with pads, three nets including antennae and three sets of upright pads. Frame to be constructed of heavy wall 2-1/2" x 1-1/2" rectangular steel tubing. Heavy formed steel hooks shall be provided on side diagonal frame members for storage of standards. Hooks shall be covered in a vinyl material to protect finish on upright posts. A large vinyl nylon net storage pouch shall be provided with tunnel loops and Velcro flaps for attaching to transport frame. Bottom of transport shall be equipped with a 20" x 48" vinyl covered storage shelf for upright pads. Entire unit to roll on four 3-1/2" diameter heavy-duty swivel casters. Overall size of unit to be 4'-3/8" in length, 3' 2-1/4" in height and 2' 6-1/4" in width to allow transporter to pass through a typical 3' wide doorway.
- I. Provide Porter #00823-100 Triple Sidewinder® Portable Volleyball net Storage System. (Provide 1 for volleyball and 3 for badminton) Net storage system shall be designed to wrap and store three volleyball nets on a free-standing, transportable rack to keep nets clean and to minimize tangles while in storage. Three special, heavy steel rack assemblies rotate on support system to grasp headband of nets and store nets in a compact cylindrical shape. Racks pivot on 1/2" diameter steel shafts with special nylon thrust washers for ease of operation. Each rack is easily rotated for compact net storage by means of a special removable, socket-type handle. Rack assemblies are supported by a centrally located 1-1/2" heavy wall square steel tube upright assembly. Base of unit shall be of heavy wall, 1-1/2" square steel tubing with four non-marking type, 4" diameter swivel casters for ease of movement to and from storage areas.

2.4 POWER-TOUCH EQUIPMENT CONTROLLER

- A. All gym equipment shall be controlled by Porter Power-Touch controls - 1 touch pad shall be provided to control all equipment. Control panels and touch pads to be provided under this Section and installed by Electrical Division.
- B. Wall-mounted keypad control system shall be designed as an alternate to conventional keyswitch type controls to operate basketball backstops, divider curtains, electric height adjusters, overhead volleyball systems batting cages, mat movers, and power control for auxiliary equipment such as lighting, scoreboards, etc. (Standard keyswitch-type operation will not be considered as an equal). Keypad control shall be capable of operating a maximum of 128 basketball backstops or other gymnasium apparatus and 32 units of auxiliary equipment. The Powr-Touch keypad is designed to require constant pressure on the pad button to control the gymnasium apparatus. Control of the auxiliary equipment is accomplished by a single touch of the appropriate button.
- C. Keypad shall incorporate a four-digit programmable security code to prevent usage by unauthorized personnel. The keypad security code may be easily reprogrammed at any time as desired to prevent unauthorized usage Keypad will automatically revert back to the secure mode if any button is not used within a ten-second period. Multiple keypads may be utilized when operation from various locations is desirable. Specify. Keypad assembly shall be flush mounted in a standard two-gang electrical box with a 12-volt control circuit to relay panels strategically located on walls or roof framing structure to minimize power conduit runs and provide substantial savings on electrical wiring requirements.
- D. The Power-Touch™ control system shall include relay panels (16 maximum), each of which is capable of operating eight momentary controlled-type (up and down) equipment and two maintained relays for controlling power of lighting, scoreboards, shot clocks, etc. Size of each relay panel enclosure is 4" x 12" x 15".
- E. Wiring of all electrical components shall be in accordance with local area codes, and in accordance with manufacturer's instructions.

- F. All conduit, wiring, junction boxes, and components not specified herein shall be furnished and installed by the electrical contractor.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that areas to receive equipment specified herein are free from impediments interfering with installation. Report in writing to the general contractor and the architect any defects which may influence completion of specified work.
- B. Do not begin installation until conditions are satisfactory.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings.
- B. Adjust backstops and backboards for plumb and level.
- C. Adjust the UP and DOWN limits on electric winches.
- D. Demonstrate operation of all units to the owner or his authorized agent.
- E. Coordinate installation with other trades as to minimize the damage to flooring and other areas.

3.3 CLOSEOUT

- A. At time of final walk through, all equipment shall be installed to its fullest capabilities (game like conditions where possible).

END OF SECTION

SECTION 11 66 43

INTERIOR SCOREBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gymnasium Scoreboards.

1.2 SUBMITTALS

- A. Submit product data and manufacturer's installation instructions for each item under provisions of Section 01 33 00.

1.3 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 01 70 00.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Nevco Scoreboard Company, (618) 664-0360.
- B. Porter Athletic Equipment Company (800) 947-6783.
- C. Substitutions: Under provisions of Section 01 33 00.

2.2 GYMNASIUM SCOREBOARDS

- A. At each full basketball court, provide one Basketball/Volleyball/Wrestling LED Scoreboard, Model 2772 (Indoor) with Shot Clock Set LED Model SSC-7, total of two units. Scoreboard and shot clock set shall be remotely controlled by Model MPCW Controller with TCS-5 Time Switch, and Optional Shot Clock Switch. Mount shot clocks at each end of basketball court. System shall be supplied and installed to provide a complete and functional system.

2.3 ACCESSORIES

- A. Provide MPCW Controller and carrying case for each scoreboard specified under this Section.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install equipment in accordance with manufacturer's printed instructions and as indicated on the drawings.
- B. Furnish all necessary hardware, anchors, inserts, connections, and embedded items necessary for proper installation. Coordinate with work of other Sections.

3.2 CLEANING

- A. Upon completion of work of this Section, Contractor shall remove all equipment, excess material and waste products from site.

3.3 GUARANTY

- A. Upon completion of work of this Section, Contractor shall provide one year guaranty in accordance with Section 01 70 00.

END OF SECTION

SECTION 11 68 13

PLAYGROUND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Playground equipment.

1.2 RELATED WORK

- A. Cast-In-Place Concrete.
- B. Control Joints, Caulking.

1.3 SUMMITTALS

- A. Submit and manufacturers printed product data and installation instructions for each item under provisions of Section 01 33 00.
- B. Submit Manufacturer's specifications, catalog cuts, operating instructions and other data required to demonstrate compliance with the specified requirements. Outline each item used in red ink.
- C. Manufacturer's recommended installation procedures which, when accepted by the architect, will become the basis for accepting or rejecting actual installation procedures used in work.

1.4 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 01 70 00.

1.5 QUALITY ASSURANCE

- A. Company specializing in the specified commercial quality playground equipment and installation with a minimum of 5 years experience.
- B. All materials shall be new and of size and type as called out on the drawings. All materials of like kind shall be one manufacturer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Porter Athletic Equipment Company, (800) 947-6783.
- B. LA Steelcraft, (800) 371-2438.
- C. Gill Athletics, (800) 637-3090.
- D. Playworld, (800) 327-7571.
- E. Miracle Playground Equipment, (800) 264-7225.

- F. Substitutions: Under provisions of Section 01 33 00.

2.2 OUTDOOR BASKETBALL

- A. At each basketball court (2 courts total) provide Porter #166 outdoor backstop with 5-9/16" O.D. vertical upright and 6' extension Backstop to be complete with support post system, backboard and goal with net. Upright support shall be 5-9/16" O.D. heavy-wall galvanized steel pipe capped at top end. Backboard shall be supported 6'-0" in front of upright support. Lower horizontal support assembly shall be fabricated from 3-1/2" O.D. heavy-wall tubing equipped with a special steel, die formed fitting for attachment to the upright support. Lower horizontal support assembly shall extend to a mounting plate directly behind the goal mounting holes to transfer all goal impact loading directly to the rear support structure to eliminate stress on the backboard. Lower horizontal support assembly shall be supported directly behind the goal mounting plate by means of a diagonally mounted heavy-wall 1-7/8" O.D. steel tube extending to the upper end of the upright support. Upper part of the backboard shall be further braced by dual, heavy-wall 1-7/8" O.D. steel tubes extending outward from the upper end of this upright support into special hinge fittings mounted on the backside of the backboard. All metal parts shall be furnished in a galvanized finish.
- B. Between each basketball court (2 courts total) provide Porter #186 outdoor backstop with 5-9/16" O.D. vertical upright and 6' extension Backstop to be complete with support post system, backboard and goal with net. Upright support shall be 5-9/16" O.D. heavy-wall galvanized steel pipe capped at top end. Backboard shall be supported 6'-0" in front of upright support. Lower horizontal support assembly shall be fabricated from 3-1/2" O.D. heavy-wall tubing equipped with a special steel, die formed fitting for attachment to the upright support. Lower horizontal support assembly shall extend to a mounting plate directly behind the goal mounting holes to transfer all goal impact loading directly to the rear support structure to eliminate stress on the backboard. Lower horizontal support assembly shall be supported directly behind the goal mounting plate by means of a diagonally mounted heavy-wall 1-7/8" O.D. steel tube extending to the upper end of the upright support. Upper part of the backboard shall be further braced by dual, heavy-wall 1-7/8" O.D. steel tubes extending outward from the upper end of this upright support into special hinge fittings mounted on the backside of the backboard. All metal parts shall be furnished in a galvanized finish.
- C. Provide each outdoor backstop with Porter #207 rectangular shaped steel perforated backboard. Backboard shall be official size 3'-6" x 6'-0". Backboard shall be of a welded, unitized construction fabricated from heavy-wall rectangular steel tubing. Goal mounting area shall be reinforced by horizontal and vertical support tubing to minimize undue loading on the perforated steel face section during slam-dunks, etc. Entire unitized frame structure shall be powder coated in a durable, neutral gray, weather-resistant finish before final assembly. Face of backboard to be silk-screened with orange perimeter and target area markings. Face of backboard shall be fabricated from heavy 11 gauge steel sheet with 1-1/2" deep formed perimeter flanges. Perforations shall be 1/4" in diameter, spaced on 1/2" diagonal centers to allow a 23% open area to minimize wind resistance. Perforated areas shall be located to outline a 3" wide perimeter and an official 24" wide target area.
- D. Provide each outdoor backstop with Porter #00251H00 Heavy Duty Goal. Goal shall be designed with double rim, continuous net support and heavy-duty side and center support gusset plates for the ultimate in strength and durability for parks and playgrounds. Double rim design shall be formed to an official 18" inside diameter with 5/8" diameter solid cold rolled steel bars. Rims shall be further supported by a continuous 3/16"x1" steel net tie strip. Net support strip shall be precision die cut with twelve net attachment openings to eliminate breakage associated with conventional type wire formed net tie clips. Rims shall be supported by a heavy mounting backplate with formed side plates tangentially connecting into the net support strip for maximum strength. Center reinforcing steel gusset shall provide additional rim support. Mounting backplate

shall provide mounting centers of 5"x5". Goal finished in a durable orange powder-coat finish. Goal furnished complete with Grade 5 carriage bolts, mounting hardware and nylon net.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all site furnishings per the manufacturer's specifications and installation instructions and as indicated on shop drawings.
- B. Furnish all necessary hardware, anchors, inserts, connections, and embedded items necessary for proper installation. Coordinate with work of other Sections.
- C. Provide a barrier free path of travel, 4'-0" wide minimum, to all playground equipment.

3.2 WARRANTY AND GUARANTEE

- A. The manufacturer's representative for each piece of play equipment installed shall visit the project site and provide a signed verification that the play equipment he represents is installed as indicated in the manufacturer's installation instructions.
- B. Contractor shall provide all manufacturer warranties and guaranties under provisions of Section 01 70 00 upon completion of work and as a condition of acceptance for all equipment shown on the drawings and described in these specifications.

END OF SECTION

SECTION 11 68 14
PLAY STRUCTURE

PART 1 GENERAL

1.1 SCOPE

- A. Furnish labor, material and equipment necessary for the provision and installation of the playground equipment, structure or modular unit as shown on the drawings and specified herein

1.2 SECTION INCLUDES

- A. Playground equipment.

1.3 RELATED WORK

- A. 03 30 00 Cast-In-Place Concrete.

1.4 REFERENCES AND STANDARDS

- A. ASTM: American Society for Testing and Materials
- B. CPSC: Consumer Product Safety Commission
- C. IPEMA: International Playground Equipment Manufacturers Association
- D. ADA: Americans with Disabilities Act
- E. ISO: International Organization for Standardization
- F. CPSI: Certified Playground Safety Inspector
- G. 2022 California Building Code: Play area along with number and types of play components shall comply with scoping requirements of CBC Section 11B-240.
- H. 2022 California Building Code: Play areas with play components and structures provided shall comply with technical requirements of CBC Section 11B-1008.

1.5 SUBMITTALS

- A. Submit and manufacturers printed product data and installation instructions for each item under provisions of Section 01 33 00.
- B. Submit Manufacturer's specifications, catalog cuts, operating instructions and other data required to demonstrate compliance with the specified requirements. Outline each item used in red ink.
- C. Manufacturer's recommended installation procedures which, when accepted by the architect, will become the basis for accepting or rejecting actual installation procedures used in work.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 01 70 00.

1.7 QUALITY ASSURANCE

- A. Company specializing in commercial quality playground equipment and installation with a minimum of 5 years experience.
- B. All materials shall be new and of size and type as called out on the drawings. All materials of like kind shall be one manufacturer.
- C. The equipment manufacturer shall warrant material and workmanship against defects, from the date of manufacturer's invoice, for the period of time as follows:
 - a. LIMITED ONE HUNDRED (100) YEAR WARRANTY against structural failure due to weather corrosion or defects in materials and workmanship on aluminum deck posts, steel deck posts, clamping/fastening (Versalok), and associated fastening hardware.
 - b. LIMITED FIFTEEN (15) YEAR WARRANTY against structural failure due to weather corrosion or defects in materials and workmanship on steel support legs and Mira-Therm II components on MEGA TOWER, TOTS' CHOICE, KIDS' CHOICE, CENTER STAGE, Nexus and Boulder Ridge Rock Wall; on playsystem steel components including railings, rungs, and rigid climbers, and Rockite.
 - c. LIMITED ONE (1) YEAR WARRANTY against structural failure caused by defective materials or defective workmanship on TODDLERS' CHOICE main support materials and decks.
 - d. LIMITED ONE (1) YEAR WARRANTY structural failure caused by defective materials or defective workmanship on Slashproof Seats and 360 degree Bucket Tot Seats for Swings.
 - e. LIMITED ONE (1) YEAR WARRANTY against structural failure due to defects in materials and workmanship for all products and components that are not specifically listed above, including, without limitation, all moving parts such as swing hangers, swivels, chains, whirls, trolleys and flexible climbers.
 - f. Repaired or replacement part(s) are only warranted for the balance of the original limited warranty. These limited warranties do not include fading of colors, damage due to excessive wear and tear, vandalism, or negligence. These warranties are valid only if products are installed according to manufacturer's installation instructions.
- D. The Contractor shall guarantee installation workmanship for a period of one year from the date of Substantial Completion of the Project. The Contractor shall be responsible for coordinating manufacturer material warranty items with the manufacturer/distributor and for the installation of replacement material(s) at no additional cost to the Owner.
- E. Provide copy of Contractor's installation warranty on company letterhead.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Miracle Playground Equipment, (800) 264-7225
- B. Substitutions: Under provisions of Section 01 33 00.

2.2 PLAYGROUND

- A. Provide and install one Play Structure and play equipment as identified in the attached exhibits at the end of this section.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all site furnishings per the manufacturer's specifications and installation instructions and as indicated on shop drawings.
- B. Furnish all necessary hardware, anchors, inserts, connections, and embedded items necessary for proper installation. Coordinate with work of other Sections.
- C. Provide a barrier free path of travel, 4'-0" wide minimum, to all playground equipment.
- D. Instructions: Explicit, printed installation instructions, written in English, shall be provided by the manufacturer, which shall include detailed, scaled plan views, elevations, and footing drawings and details when applicable, as well as sequential assembly instructions to assure proper installation of the playground equipment, structure or modular unit.
- E. Equipment must be installed by a manufacturer-certified installer and must be installed in accordance with the manufacturer's installation instructions. Installation crew leader must be CPSI-certified. If not installed by a manufacturer-certified installer, the equipment shall be inspected after installation by a CPSI not employed by the installer and signed off by said CPSI before the playground is opened for first use.
- F. Close Out: Contractor shall provide the Owner with one copy of complete manufacturer's installation instructions and maintenance kit if provided. Most manufacturers send at least two sets of installation manuals with each order. Additional sets of installation instructions should be purchased from the manufacturer if originals are lost or damaged. It is the Contractor's responsibility to secure the installation instructions from the installer. Miracle Recreation mails one complete set of installation instructions directly to the Owner, and the Contractor shall not be required to supply additional sets to the Owner.
- G. Clean-up: The site shall be kept clean and free of tools, trash, debris and installation materials on a daily basis. Material may be stored on site during installation with appropriate protective measures and approval by the Owner's representative.

3.2 WARRANTY AND GUARANTEE

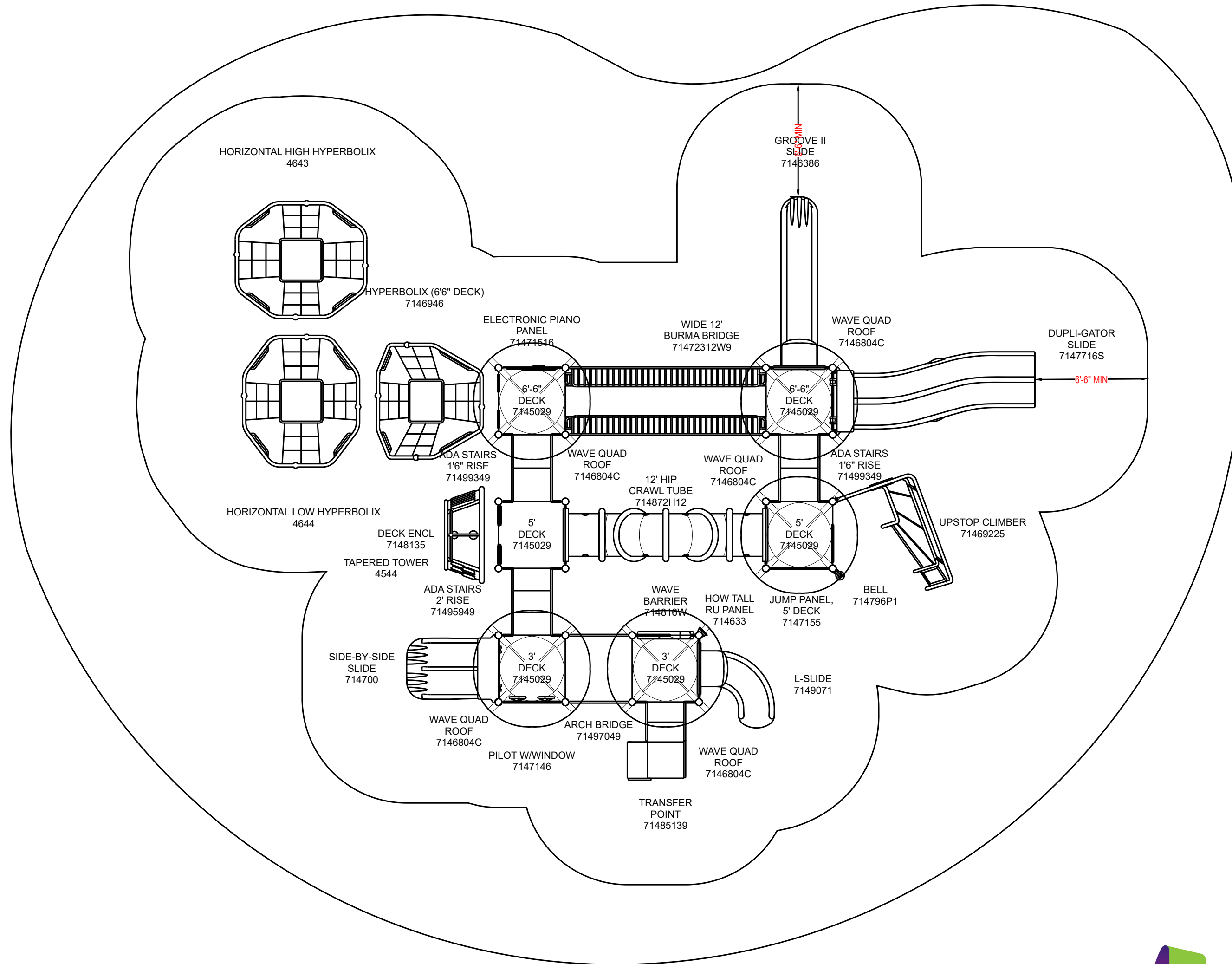
- A. The manufacturer's representative for each piece of play equipment installed shall visit the project site and provide a signed verification that the play equipment he represents is installed as indicated in the manufacturer's installation instructions.
- B. Contractor shall provide all manufacturer warranties and guaranties under provisions of Section 01 70 00 upon completion of work and as a condition of acceptance for all equipment shown on the drawings and described in these specifications.

END OF SECTION

Silver Valley Gym Apple Valley, CA

AGE GROUP:	5-12
ELEVATED PLAY ACTIVITIES - TOTAL:	11 REQ'D 6
ELEVATED PLAY ACTIVITIES ACCESSIBLE BY TRANSFER:	11 REQ'D 6
ELEVATED PLAY ACTIVITIES ACCESSIBLE BY RAMP:	0 REQ'D 0
GROUND LEVEL ACTIVITY TYPE:	3 REQ'D 3
GROUND LEVEL QUANTITY:	5 REQ'D 4

FOR KIDS AGES
5-12
YEARS



To verify product certification, visit www.ipema.org



MIRACLE PLAYGROUND SALES, INC.

9106 Pulsar Ct
Corona, CA

PHONE NO: (800) 264-7225 x102
FAX NO: (877) 215-3869

R0036_45037453938

GROUND SPACE: 49'-0" x 35'-0"

PROTECTIVE AREA: 61'-0" x 48'-0"

DRAWN BY: Bryce Lawrence

DATE: 4/21/2023

COMPLIES TO ASTM/CPSC

COMPLIES TO ADA

To promote safe and proper equipment use by children, Miracle recommends the installation of either a Miracle safety sign or other appropriate safety signage near each playsystem's main entry point(s) to inform parents and supervisors of the age appropriateness of the playsystem and general rules for safe play.

THE PLAY COMPONENTS IDENTIFIED IN THIS PLAN ARE IPEMA CERTIFIED. THE USE AND LAYOUT OF THESE COMPONENTS CONFORM TO THE REQUIREMENTS OF ASTM F1487.

AN ENERGY ABSORBING PROTECTIVE SURFACE IS REQUIRED UNDER & AROUND ALL PLAY SYSTEMS

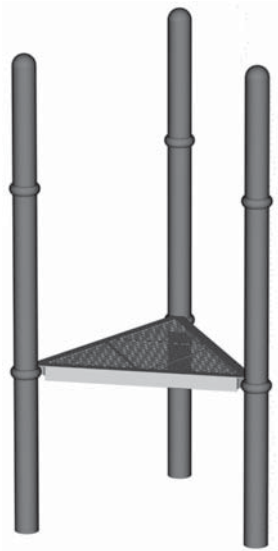
Kids' Choice® - Mira-Therm II
Decks

Deck Posts not included in these assemblies.

714-501-9

Triangle Deck

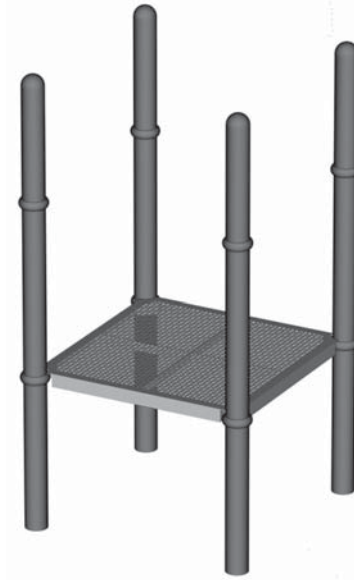
Model # 714-501-9 requires three (3) Posts.



714-502-9

Square Deck

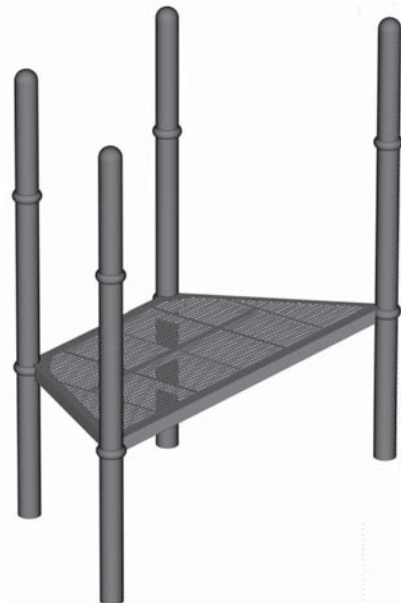
Model # 714-502-9 requires four (4) Posts.



714-503-9

Half Hex Deck (Full)

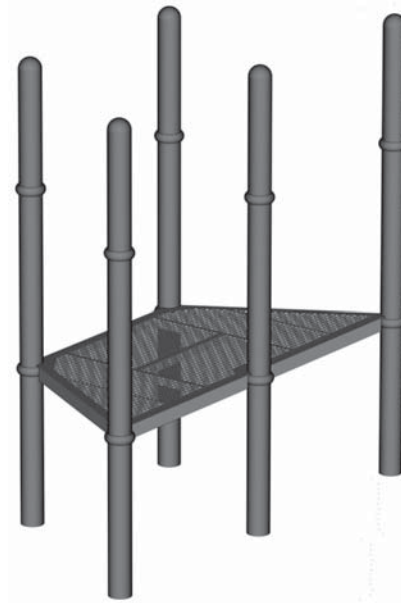
Model # 714-503-9 requires four (4) Posts.



714-504-9

Half Hex Deck

Model # 714-504-9 requires five (5) Posts.



Kids' Choice® - Mira-Therm II
Decks

714-508-9

Rectangle Deck (Full)

Model # 714-508-9 requires four (4) Posts.



714-509-9

Rectangle Deck (Half Open)

Model # 714-509-9 requires five (5) Posts.



714-510-9

Rectangle Deck (Open)

Model # 714-510-9 requires six (6) Posts.

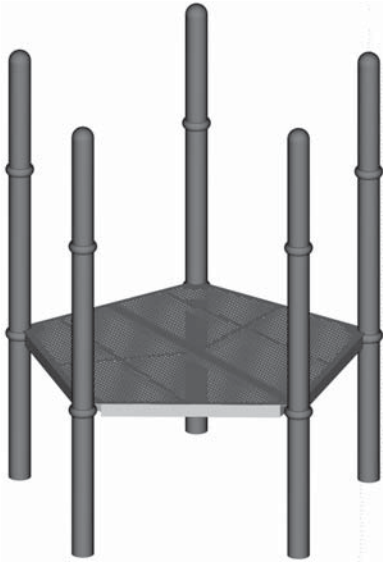


Kids' Choice® - Mira-Therm II
Decks

714-512-9

Pentagon Deck

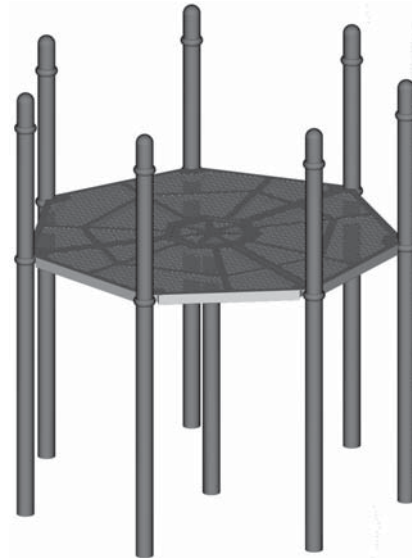
Model # 714-512-9 requires five (5) Posts.



714-517-9

Heptagon Deck

*Model # 714-517-9 requires seven (7) Posts
and one (1) middle support post.*



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**Kids' Choice® - Mira-Therm II
Decks**

<u>MODEL #</u>	<u>PRODUCT</u>	<u>POSTS REQ'D</u>	<u>DECK SURFACE</u>	<u>CONCRETE</u>
714-501-9	Triangle Deck	3	7 sq. ft.	See Post specs
714-502-9	Square Deck	4	16 sq. ft.	"
714-503-9	Half Hex Deck (Full)	4	21 sq. ft.	"
714-504-9	Half Hex Deck (Open)	5	21 sq. ft.	"
714-508-9	Rectangle Deck (Full)	4	32 sq. ft.	"
714-509-9	Rectangle Deck (Half Open)	5	32 sq. ft.	"
714-510-9	Rectangle Deck (Open)	6	32 sq. ft.	"
714-512-9	Pentagon Deck	5	26.5 sq. ft.	"
714-517-9	Heptagon Deck	7	55 sq. ft.	"

DESCRIPTION

Mira-Therm II deck models include an equilateral triangle deck, a square deck, two half hexagon decks, three rectangular decks, a pentagon deck, and a heptagon deck. Decks are designed for maximum flexibility in height of deck surface, from 0" to 6'-6" (in 6" increments), though 3', 5', and 6'-6" are considered standard deck heights.

Decks are designed on a 48" center-to-center spacing on 5" deck posts, at equal or varied heights. All deck-to-post connections are made with a deck support clamp. All deck connections are made beneath deck with no exposed fasteners on deck perimeter. Decks with 8' wide open side are designed to attach to another deck with 8' wide open side at same deck height.

MATERIALS

Decks: All decks shall be constructed with folded 11 ga. steel sheet forming 3" tall sides. Decking sheets shall be perforated with a staggered pattern of 3/8" diameter holes at 5/8" apart center-to-center. The decking shall have 7 ga. by 2" flat steel braces and corner braces of 7 ga. steel. The entire assembly shall be solid welded prior to PVC coating.

Fasteners: Deck assemblies shall contain Versalok Fasteners and Fastener Style A hardware.

Finishes: All deck surfaces shall be coated in Mira-Therm. Clamps shall have a Mira-Cote finish.

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

Kids' Choice®

Steel Posts (5" O.D., 11 ga. Round Tube) & Aluminum Posts

Steel Posts - 5" O.D., 11ga.

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>USES</u>	<u>PART NUMBER</u>
714-545-3	144" Deck Post (Cheer Roof)	3' Deck	997292*
714-545-5	168" Deck Post (Cheer Roof)	5' Deck	997294*
714-545-6	186" Deck Post (Cheer Roof)	6'-6" Deck	908813*
714-545-8	204" Deck Post (Cheer Roof)	8' Deck	997297*
714-545-10	228" Deck Post (Cheer Roof)	10" Deck	908812*
714-549-1	88" Maze Post	Sensory Panel	925341*
714-549-3	112" Deck Post	3' Decks	995228*
714-549-4	124" Deck Post	4' Decks	995229*
714-550-3	206" Deck Post (PlayCover)	3' Deck & less	997215*
714-550-5	219" Deck Post (PlayCover)	3'-6" to 5' Decks	997218*
714-550-6	243" Deck Post (PlayCover)	5'-6" to 6'-6" Decks	997203*
714-550-8	258" Deck Post (PlayCover)	7' to 8' Decks	997315*
714-551	106" Deck Post	2'-6" Decks & less	713551*
714-552	136" Deck Post	3' to 5' Decks	713552*
714-552L	136" Deck Post w/CPSIA Label	3' to 5' Decks	996061*
714-553	160" Deck Post	5'-6" to 6'-6" Decks	713553*
714-554	178" Deck Post	7' to 8' Decks	713554*
714-556	196" Deck Post	10' Deck	985244*
714-571	106" Post (Roof)	Ground Level	713561*
714-571L	106" Post (Roof) w/CPSIA Label	Ground Level	996352*

Note: An () by a part number indicate: Color Code Required.*

Consult Miracle's "Glossary of Technical Data for Materials, Processes and Finishes" for specifications of underlined items.

5" O.D., 11 ga. Steel Posts & Aluminum Posts

714-545-3, 714-545-5, 714-545-6, 714-545-8, 714-545-10, 714-549-1, 714-549-3, 714-549-4, 714-549-10, 714-549-12, 714-550-3, 714-550-5, 714-550-6, 714-550-8, 714-551, 714-551-2, 714-552, 714-552-2, 714-552-L, 714-553, 714-553-2, 714-554, 714-554-2, 714-556, 714-571, 714-571-2, 714-571L, 714-572, 714-572-2, 714-573, 714-573-2, 714-574, 714-574-2, 714-575, 714-576, 714-576-8, 714-576-10

5" O.D., 11 ga. Steel Posts & Aluminum Posts

Kids' Choice®

Steel Posts (5" O.D., 11 ga. Round Tube) & Aluminum Posts

Steel Posts - 5" O.D., 11ga. cont.

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>USES</u>	<u>PART NUMBER</u>
714-572	144" Deck Post (Roof)	3' Decks & less	713572*
714-573	168" Deck Post (Roof)	3'-6" to 5' Decks	713573*
714-574	186" Deck Post (Roof)	5'-6" to 6'-6" Decks	713574*
714-575	196" Deck Post (Uses 2 for Flippo Roof)	6'-6" Deck	985260*
714-576	204" Deck Post (Roof)	8' Deck	713818*
714-576-8	228" Deck Post (Topper)	8' Deck	994097*
714-576-10	252" Deck Post (Topper)	10' Deck	994407*

Aluminum Posts - 5" O.D.

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>USES</u>	<u>PART NUMBER</u>
714-549-32	112" Deck Post	3' Decks	995230*
714-549-42	124" Deck Post	4' Decks	995231*
714-551-2	106" Deck Post	2'-6" Decks & less	713593*
714-552-2	136" Deck Post	5' Decks	713594*
714-552-2L	136" Deck Post w/CPSIA Label	5' Decks	996065*
714-553-2	160" Deck Post	5'-6" to 6'-6" Decks	713595*
714-554-2	178" Deck Post	7' to 8' Decks	713599*
714-571-2	106" Post (Roof)	Ground Level	713588*
714-572-2	144" Deck Post (Roof)	3' Decks & less	713589*
714-573-2	168" Deck Post (Roof)	3'-6" to 5' Decks	713590*
714-574-2	186" Deck Post (Roof)	5'-6" to 6'-6" Decks	713591*

Consult Miracle's "Glossary of Technical Data for Materials, Processes and Finishes" for specifications of underlined items.

714-545-3, 714-545-5, 714-545-6, 714-545-8, 714-545-10, 714-549-1, 714-549-3, 714-549-32, 714-549-4, 714-549-42, 714-550-3, 714-550-5, 714-550-6, 714-550-8, 714-551, 714-551-2, 714-552, 714-552L, 714-552-2, 714-552-2L, 714-553, 714-553-2, 714-554, 714-554-2, 714-556, 714-571, 714-571-2, 714-571L, 714-572, 714-572-2, 714-573, 714-573-2, 714-574, 714-574-2, 714-575, 714-576, 714-576-8, 714-576-10

Kids' Choice®

Steel Posts (5" O.D., 11 ga. Round Tube) & Aluminum Posts

CONCRETE

0.13 cubic yards required per post

0.26 cubic yards per post for model's 714-550-3, 714-550-5, 714-550-6 and 714-550-8.

DESCRIPTION

Posts are used for support of deck systems and freestanding components.

MATERIALS

Steel Post

Assembly:

 Steel posts shall be constructed of 5" tube, 11 ga. Posts not designed for roof assemblies shall have 5" round end caps pressed in at the factory.

Aluminum Post

Assembly:

 Aluminum posts shall be constructed of 5" aluminum tube. Posts not designed for roof assemblies shall have 5" round end caps pressed in at the factory.

Fasteners:

 Components shall be field assembled to Posts by means of Versalok Fasteners, Fastener Style A hardware and/or Fastener Style B hardware.

Finishes:

 Post assemblies and clamps shall be finished in Mira-Cote.

5" O.D., 11 ga. Steel Posts & Aluminum Posts

Consult Miracle's "Glossary of Technical Data for Materials, Processes and Finishes" for specifications of underlined items.

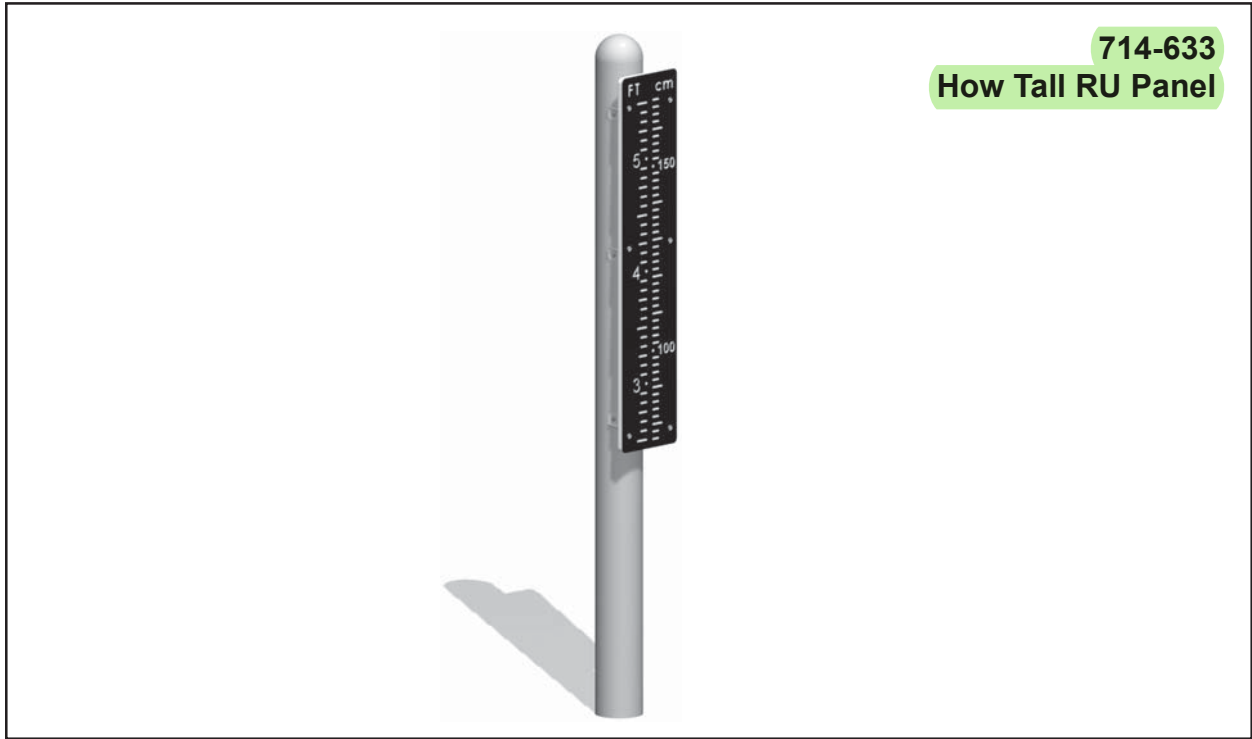
714-545-3, 714-545-5, 714-545-6, 714-545-8, 714-545-10, 714-549-1, 714-549-3, 714-549-32, 714-549-4, 714-549-42, 714-550-3, 714-550-5, 714-550-6, 714-550-8, 714-551, 714-551-2, 714-552, 714-552L, 714-552-2, 714-552-2L, 714-553, 714-553-2, 714-554, 714-554-2, 714-556, 714-571, 714-571-2, 714-571L, 714-572, 714-572-2, 714-573, 714-573-2, 714-574, 714-574-2, 714-575, 714-576, 714-576-8, 714-576-10



Product Specifications

MIRACLE
RECREATION EQUIPMENT COMPANY

Kids' Choice®
How Tall RU Panel



How Tall RU Panel

<u>MODEL #</u>	<u>PRODUCT</u>	<u>GRD SPACE</u>	<u>PROT AREA</u>	<u>CONCRETE</u>
714-633	How Tall RU Panel	8" x 3-3/4"	13'-2" x 12'-9 3/4"	N/A

DESCRIPTION

The How Tall RU Panel is an easy, colorful way for kids to see how quickly they grow. Simple post mounted Panel is marked in both centimeters and feet.

MATERIALS

- Panel: The panel shall be constructed of Mira-Lene with all corners rounded. Panel shall have routed inches/feet and centimeters. Panel shall measure 39 7/8" x 8".
- Brackets: Brackets shall be constructed of 11 ga. A-60 sheet.
- Fasteners: Each assembly shall contain Fastener Style A hardware.
- Finishes: Panel and brackets shall have a Mira-Cote finish.

714-633

Kids' Choice®
Groove II® Slides

714-638-4

4' Groove II Slide



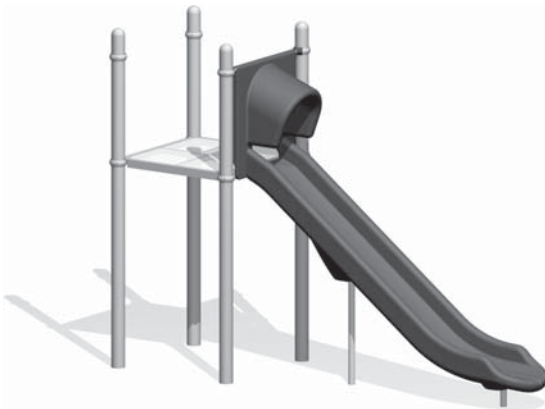
714-638-5

5' Groove II Slide



714-638-6

6' & 6'-6" Groove II Slide



714-638-8

8' Groove II Slide



<u>MODEL #</u>	<u>PRODUCT</u>	<u>GRND SPC.</u>	<u>PROT. AREA</u>	<u>CONCRETE</u>
714-638-4	4' Groove II Slide	2'-2" x 5'-9"	16' x 15'	.04 cu. yds.
714-638-5	5' Groove II Slide	2'-2" x 7'-6"	20' x 15'	.04 cu. yds.
714-638-6	6' & 6'-6" Groove II Slide	2'-2" x 10'-3"	24' x 15'	.08 cu. yds.
714-638-8	8' Groove II Slide	2'-2" x 13'-1"	28' x 15'	.08 cu. yds.

DESCRIPTION

The Groove II Slides features a hooded canopy and a streamline slide design. Groove II is designed to exit from either a 4', 5', 6', 6'-6" or 8' Deck.

Groove II Slides

714-638-4, 714-638-5, 714-638-6, 714-638-8

Kids' Choice® Groove II® Slides

MATERIALS:

- Slide:** The canopy panel and one-piece slide shall be constructed of double wall Rockite. The slide shall have 6" high side rails, an overall width of 25", an 18" wide sliding surface and approximate 7' (714-638-4), 9' (714-638-5), 12' (714-638-6) and 15' (714-638-8) bedway length. The canopy panel shall be field mounted to deck and to post clamps via a 41-1/2" long rung constructed of 1" pipe.
- Legs:** The legs shall be 2" pipe, welded to an 11 ga. A-60 Galvannealed mounting bracket.
- Fasteners:** Each assembly shall contain Versalok Fasteners and Fastener Style A hardware.
- Finishes:** The rung, legs, and clamps shall have a Mira-Cote finish. The Rockite slide and canopy shall have molded-in color.



Kids' Choice® Wave Roof

714-680-4C
Square Wave Roof with
Topper



714-680-6C
Hex Wave Roof with
Topper



Wave Roof

DESCRIPTION

Wave Roofs shall act as an attractive roof to provide shade to your system.

MATERIALS

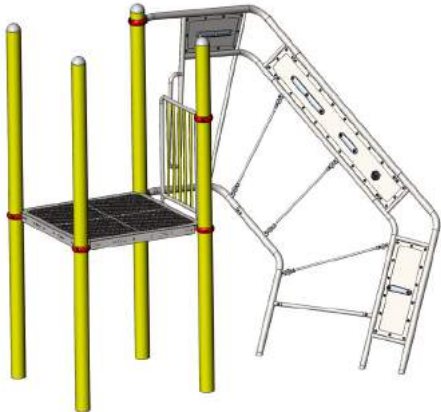
Roof/Topper: Roof and Post Topper shall be constructed of Rockite®.

Post Weldments: Post Weldment shall comprise an angle plate, cape and plate of 3 mm galvanized sheet, a tube support of RDTB ILG 60.3 mm x 2.7 mm, a 12.5 mm diameter steel rod roof support and a swage constructed of RDTB ILG 127.0 mm x 3.0 mm.

Fasteners: The assembly shall contain Versalok Fasteners and Fastener Style A hardware.

714-680-4C, 714-680-6C

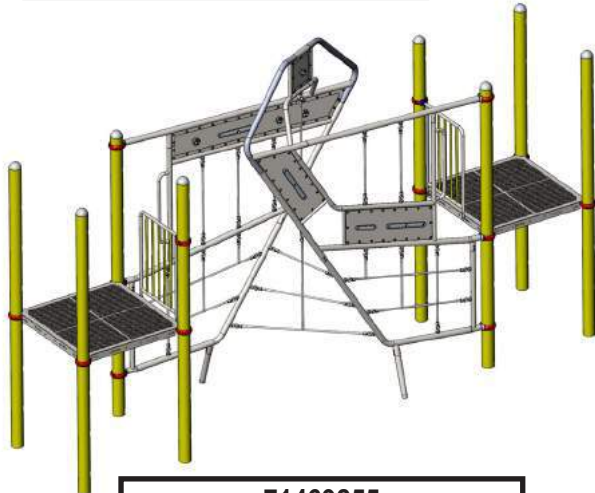
Upstop, Terrain, Inversion, Shuttle Climbers



71469225, 71869225, 70469225
UPSTOP CLIMBER



7146923, 7186923, 7046923
TERRAIN CLIMBER



71469255
INVERSION CLIMBER



71469214, 71869214, 70469214
SHUTTLE CLIMBER

Upstop, Terrain, Inversion, Shuttle Climbers

71469225, 71869225, 70469225, 7146923, 7186923, 7046923, 7186923, 71469255, 71469214, 71869214, 70469214

Model #	Product	Protective Area	Ground Space	Concrete
71469225	Upstop Climber KC	19' x 18'	7' x 8'	0.50 cu.yds.
71869225	Upstop Climber TC	19' x 18'	7' x 8'	0.50 cu.yds.
70469225	Upstop Climber TCX	19' x 18'	7' x 8'	0.50 cu.yds.
7146923	Terrain Climber KC	16' x 20'	4' x 8'	See Post Specs
7186923	Terrain Climber TC	16' x 20'	4' x 8'	See Post Specs
7046923	Terrain Climber TCX	16' x 20'	4' x 8'	See Post Specs
71469255	Inversion Climber KC	16' x 24'	4' x 12'	0.20 cu.yds.
71469214	Shuttle Climber KC	16' x 16'	4' x 4'	See Post Specs
71869214	Shuttle Climber TC	16' x 16'	4' x 4'	See Post Specs
70469214	Shuttle Climber TCX	16' x 16'	4' x 4'	See Post Specs

Upstop, Terrain, Inversion, Shuttle Climbers

UPSTOP CLIMBER DESCRIPTION

The Upstop Climber is a challenging climber with sturdy ropes and handholds that allow children to practice balance while increasing upper and lower body strength. The climber is designed to attach to a deck.

TERRAIN CLIMBER DESCRIPTION

The Terrain Climber is a challenging climber with sturdy ropes and handholds that allow children to practice balance while increasing upper and lower body strength. The climber is designed to attach in between decks.

INVERSION CLIMBER DESCRIPTION

The Inversion Climber is a challenging climber with sturdy ropes and handholds that allow children to practice balance while increasing upper and lower body strength. The climber is designed to attach in between decks.

SHUTTLE CLIMBER DESCRIPTION

The Shuttle Climber is a challenging climber with sturdy ropes that allow children to practice balance while increasing upper and lower body strength. The climber is designed to attach to a deck.

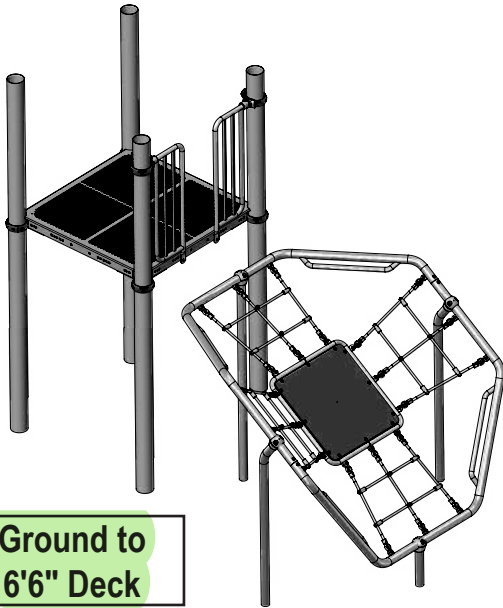
MATERIALS

Frame	Frame shall be constructed of 2-3/8" 12-gauge tubing, 1.9" 11-gauge tubing, and <u>1" pipe</u> . The panel frame plate shall be constructed of 7-gauge sheet steel. The rope blocks shall be made from mild steel. All solid <u>welded</u> .
Panels	Panels shall be made from 11-gauge sheet steel.
Handholds	Handholds shall be cast alloyed aluminum.
Crossbars	Shall be constructed of <u>1" pipe</u> .
Ropes	Shall be constructed of 16mm diameter, steel reinforced nylon braided rope with a galvanized foundation steelwork.
Fasteners	Shall contain <u>Versalok Fasteners</u> and <u>Fastener Style A</u> hardware.
Finishes	The frame, panels, handholds, crossbars, and clamps shall have a <u>Mira-Cote</u> finish.

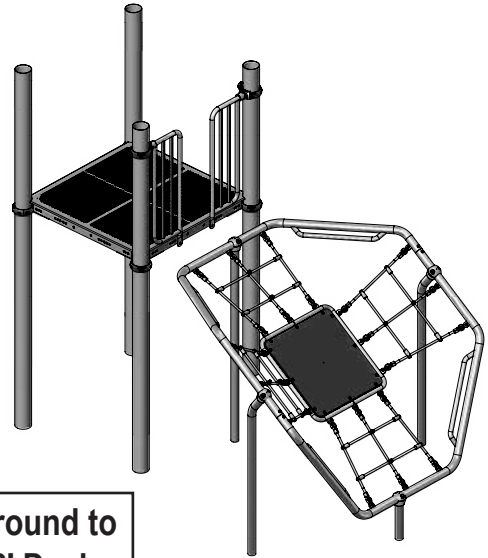
Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

Kids' Choice®

Hyperbolix™ Ground to 6'-6" Deck and 3' Deck to 3' Deck



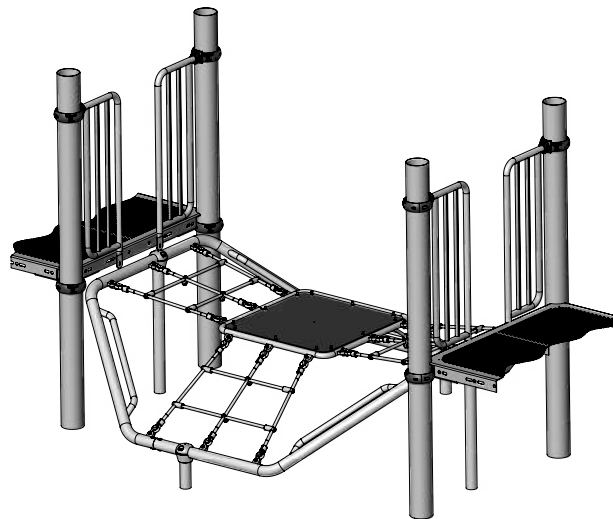
Ground to 6'6" Deck



Ground to 6' Deck

Model 7146946

Hyperbolix™ Ground to 6'6" Deck



Model 71469433

Hyperbolix™ 3' Deck to 3' Deck

Hyperbolix™ Ground to 6'-6" Deck and 3' Deck to 3' Deck

7146946, 71469433

Model #	Product	Concrete
7146946	Hyperbolix™ Ground to 6'-6" Deck	0.20 cu.yds.
71469433	Hyperbolix™ 3' Deck to 3' Deck	0.20 cu.yds.

Kids' Choice®

Hyperbolix™ Ground to 6'-6" Deck and 3' Deck to 3' Deck**DESCRIPTION**

Hyperbolix™ is a challenging climber with sturdy ropes that allow children to practice balance while increasing upper and lower body strength. The climber is versatile in that it be used free-standing or link to a deck. It is also modular in that it can be used to create a large or small wave net like structure.

MATERIALS

Frame	Shall be constructed of 2-3/8" O.D. 12-gauge tubing and <u>1" pipe</u> . The rope blocks shall be made from mild steel. All solid <u>welded</u> .
Portal	Shall be constructed from 1" pipe. The rope blocks shall be made from mild steel. The support plate (when required) shall be constructed of 7-gauge sheet steel. All solid <u>welded</u> . The portal shall be filled in with <u>Flextread</u> (when required).
Support Legs	Shall be constructed of 2-3/8" O.D. 12-gauge tubing.
Rope Nets	Shall be constructed of 16mm diameter, steel reinforced nylon braided rope with a galvanized foundation steelwork.
Castings	Shall be constructed of cast alloyed aluminum.
Fasteners	Shall contain <u>Versalok Fasteners</u> and <u>Fastener Style A</u> hardware.
Finishes	All metal shall be finished in <u>Mira-Cote</u> .
Enclosure	Shall comprise main rail and enclosure tube of <u>1" pipe</u> x 14 galv. embossed, spokes of <u>3/4" x 1" oval tube</u> x 15 gauge galv. All solid <u>welded</u> .

NOTE:

For modular installations that link to either the ground to deck or deck to deck model, see **Hyperbolix™ Vertical, Angled, Horizontal High, and Horizontal Low product specifications sheet # P4641** for Protective Area, Ground Space, and Concrete information for each of the vertical, angled, horizontal high, and horizontal low Hyperbolix™ models.



Kids' Choice®

Side-by-Side Slide, Bump & Glide Slides and Bunny Hill Slide

714-700

Slide 5' Side-by-Side w/Canopy 3' Deck



714-728-4

Slide Bump & Glide One Piece 4' Deck



714-728-5

**Slide Bump & Glide One PC
4'-6", 5', 5'-6" DK**



714-736

Slide Bunny Hill w/Canopy 3' Deck



Side-by-Side, Bump & Glide and Bunny Hill Slide

Consult Miracle's "Glossary of Technical Data for Materials, Processes and Finishes" for specifications of underlined items.

714-700, 714-728-4, 714-728-5, 714-736

Kids' Choice®

Side-by-Side Slide, Bump & Glide Slides and Bunny Hill Slide

<u>MODEL</u>	<u>PRODUCT</u>	<u>GRND SPACE</u>	<u>PROT. AREA</u>	<u>CONCRETE</u>
714-700	Slide 5' Side-by-Side w/Canopy 3' Deck	4'-1" x 5'-8"	16' x 18'-1"	.05 cu. yds.
714-728-4	Slide Bump & Glide One Piece 4' Deck	4'-1" x 8'-11"	16'-1" x 22'-5"	.10 cu. yds.
714-728-5	Slide Bump & Glide One PC 4'-6", 5', 5'-6" DK	4'-1" x 10'-1"	16'-1" x 24'-6"	.10 cu. yds.
714-736	Slide Bunny Hill w/Canopy 3' Deck	4'-1" x 7'-5"	16'-3" x 19'-10"	.05 cu. yds.

DESCRIPTION

Model 714-700 is a dual bedway Groove slide for 3' Deck; Model 714-728-4 and 714-728-5 are double bedway slides for a 4' deck and 5' deck respectively, with one bedway Mogul, the other Groove; Model 714-736 is a single wide-bedway Groove slide for a 3' deck. Each slide features a Rockite canopy.

MATERIALS

Side-by-Side Slide: The slide shall be constructed of Rockite with threaded fasteners incorporated for assembly. The dimensions shall be: each bedway width, 17"; outside overall, 42"; rail width, 3"; top of bedway to top of rail, 4-1/2"; bedway thickness, 3"; and bedway length, 5'-5".

Bump & Glide Slides: The slide shall be constructed of Rockite with threaded fasteners incorporated for assembly. The dimensions shall be: bedway width, 16-1/4"; outside overall, 40"; inside rail width, 1-1/4"; outside rail widths, 1-1/2"; top of bedway to top of rail, 7-1/2" - 8-1/2"; bedway thickness, 4-1/2" - 5-1/2"; and bedway length, approximately 8' (for 714-728-4) and 10' (for 714-728-5).

Bunny Hill Slide: The slide shall be constructed of Rockite with threaded fasteners incorporated for assembly. The dimensions shall be: bedway width, 31-1/4"; outside overall, 40"; rail width, 3-5/8"; top of bedway to top of rail, 6-1/2"; and bedway thickness, 4-1/2".

"T" Leg: The front "T" leg, and middle leg for Model 714-728-4 and 714-728-5, shall comprise an upright and a top. The upright shall be constructed of 2" pipe with a 1-1/4" x 3-1/4" channel top constructed of 11 ga. sheet, welded to the upright in a "T" configuration.

Canopy: The canopy shall be constructed of Rockite with threaded fasteners incorporated for assembly. The canopy shall have an inside width of 39" and an outside width of 44" and shall be slanted at 37 degrees. It shall be field-attached to the posts via clamps and a 41-1/2" rung of 1" pipe.

Fasteners: Each assembly shall contain Versalok Fasteners and Fastener Style A hardware.

Finishes: The Rockite slide and canopy shall have color molded in. The legs, rung, and clamps shall have a Mira-Cote finish.

Consult Miracle's "Glossary of Technical Data for Materials, Processes and Finishes" for specifications of underlined items.

Kids' Choice®

Imagination Panels & Activity Panels

Models included:

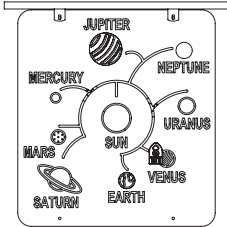
<u>MODEL</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
714-617	Space Ship Panel	2
714-714-1	Park Ranger Panel	2
714-714-2	Fire Truck Panel	2
714-714-3	Police Panel	2
714-714-4	Train Panel	2
714-714-5	Taxi Panel	2
714-714-6	Pilot Panel with Window	2
714-714-7	Pilot Panel	2
714-714-8	Race Car Panel	2
714-715-1	Alphabet Panel	2
714-715-2	Finger Maze Panel	2
714-715-3	Jump Panel (3' Deck)	2
714-715-4	Calculator Panel	2
714-715-5	Jump Panel (5' Deck)	2
714-715-10	Sign Language Panel	2
714-715-11	Spanish Panel	2
714-715-12	Braille Panel	3
714-715-13	Calypso 3-Drum Panel	3
714-715-15	Chinese Panel	3
714-715-20	Activity Panel Frame	3
714-732	Welcome Panel (5-12)	3
714-732-1	Welcome Panel (2-5)	3
714-732-2	Welcome Panel (2-12)	3
714-761-2	Piston Panel	3
714-761-3	Gear Panel	3
714-761-4	Sliding Tile Panel	3
714-895-1	Barn Wall Panel	3
714-895-3	Barn Window Panel	3

Note: Deck systems are NOT included in these assemblies. Please refer to Construction Drawings for the model particular to your system.

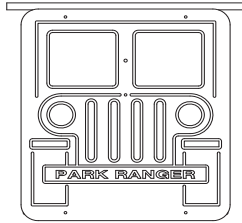
Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

Kids' Choice®
Imagination Panels & Activity Panels

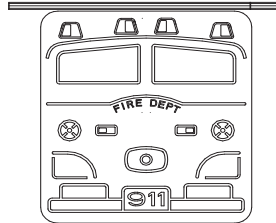
714-617:
Space Ship Panel



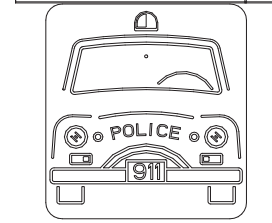
714-714-1:
Park Ranger Panel



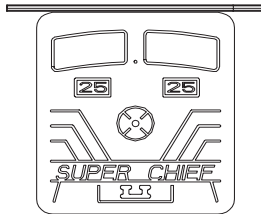
714-714-2:
Fire Truck Panel



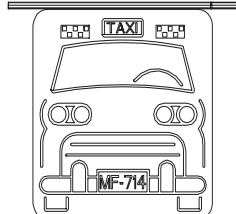
714-714-3:
Police Panel



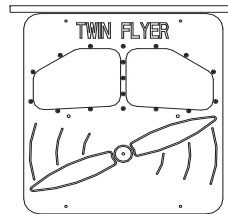
714-714-4:
Train Panel



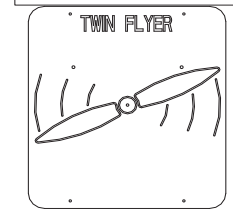
714-714-5:
Taxi Panel



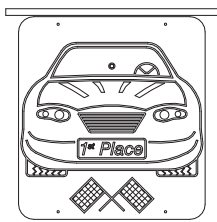
714-714-6:
Pilot Panel w/ Window



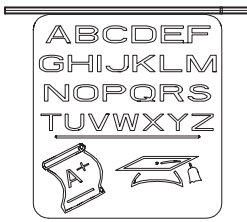
714-714-7:
Pilot Panel



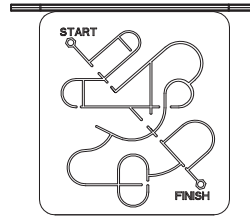
714-714-8:
Race Car Panel



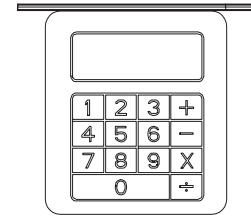
714-715-1:
Alphabet Panel



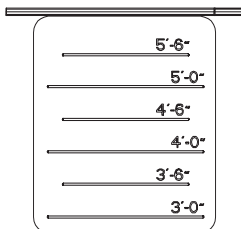
714-715-2:
Finger Maze Panel



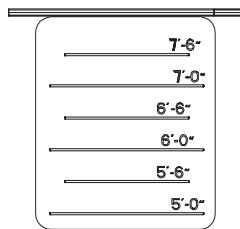
714-715-4:
Calculator Panel



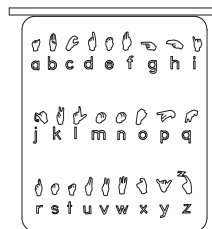
714-715-3:
Jump Panel (3' Deck)



714-715-5:
Jump Panel (5' Deck)



714-715-10:
Sign Language Panel



714-715-11:
Spanish Panel



Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

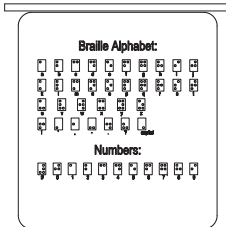
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Kids' Choice®

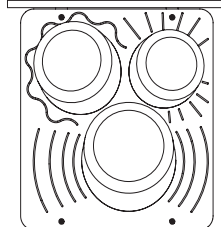
Imagination Panels & Activity Panels

Imagination Panels & Activity Panels

**714-715-12:
Braille Panel**



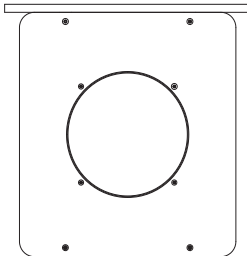
**714-715-13:
Calypso 3-Drum Panel**



**714-715-15:
Chinese Panel**



**714-715-20:
Activity Panel Frame**



**714-732-1:
Welcome Panel (2-5)**



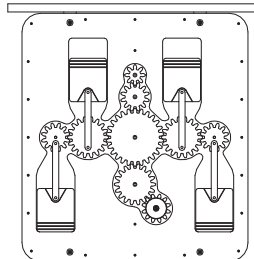
**714-732-2:
Welcome Panel (2-12)**



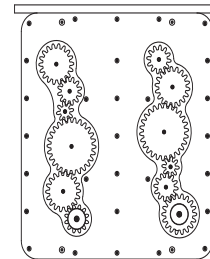
**714-732:
Welcome Panel (5-12)**



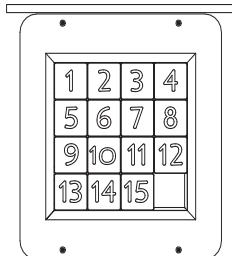
**714-761-2:
Piston Panel**



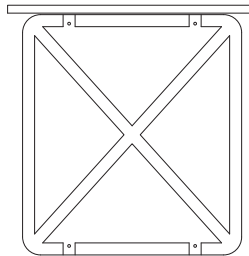
**714-761-3:
Gear Panel**



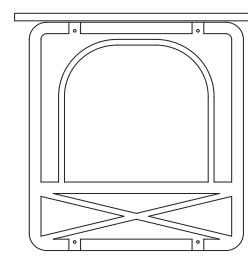
**714-761-4:
Sliding Tile Panel**



**714-895-1:
Barn Wall Panel**



**714-895-3:
Barn Window Panel**



Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

714-617, 714-714-1, 714-714-2, 714-714-3, 714-714-4, 714-714-5, 714-714-6, 714-714-7, 714-714-8, 714-715-1, 714-715-2, 714-715-3, 714-715-4, 714-715-5, 714-715-10, 714-715-11, 714-715-12, 714-715-13, 714-715-15, 714-715-20, 714-732, 714-732-1, 714-732-2, 714-761-2, 714-761-3, 714-761-4, 714-895-1, 714-895-3

Kids' Choice® Imagination Panels & Activity Panels

DESCRIPTION

These deck-mounting representational activity panels are designed to enhance imagination and creative play.

- Welcome panels are decorative and display the intended user age range.
- Vehicle-themed panels feature steering wheel assemblies.
- The Piston Panel, Gear Panel, Hypnotize Insert, Funyhouse Insert, Very Buried Insert, A-maze-ing Insert and Four-the-Win Insert, contain dynamic, user-driven parts sealed behind a transparent, tamper-resistant cover.
- The Sliding Tile Panel and Slide & Solve Insert, contains 15 routed, moveable tiles with one empty space challenging users to shift the tiles into proper sequence.
- The Calypso 3-Drum Panel and Magical Music Insert allows musical expression, that may be struck with the hands to create different sounds.

MATERIALS

Panels:	The panels shall be constructed of <u>Mira-Lene</u> with all corners rounded. Panels shall measure 36-1/2" x 40".
Pilot Panel w/ Window: Model 714-714-6 only	In addition to the above materials and specifications, Model 714-714-6 shall feature a clear polycarbonate window mechanically fastened to the panel.
Gear Panel and Piston Panel: Model 714-761-3, 714-761-2 only	In addition to the above materials and specifications, Model 714-761-3 shall contain a clear polycarbonate cover mechanically fastened over two side-by-side sets of 1/4" thick gears, to be constructed of high-density polyethylene, which shall turn on nylon bushings, except for black nylon handles and drive gears which shall turn on bronze bushings. Its opposite side shall contain side-by-side routed finger mazes. Model 714-761-2 shall contain a cover, gears, and knob as described herein, and connecting rod and piston shapes of 1/4" thick high-density polyethylene as well. Its opposite side shall contain routed designs.
Sliding Tile Panel: Model 714-761-4 only	In addition to material and specifications detailed in "panels" paragraph above, Model 714-761-4 shall contain 15 moveable, tongue-and-groove tiles with routed numerals constructed of 1/4" thick high-density polyethylene.
Calypso 3-Drum Panel: Model 714-715-13 only	In addition to material and specifications detailed in "panels" paragraph above, Model 714-715-13 shall contain 3 rotational molded drums of low density polyethylene resin. Each drum is attached to the panel through a cover plate constructed of 11 ga. galvanized steel sheet with a <u>Mira-Cote</u> finish.
Rung Bracket:	The rung brackets shall be constructed of <u>1" pipe</u> with bolting tabs of 11 ga. <u>A-60 Galvannealed</u> sheet, all solid <u>welded</u> .

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

714-617, 714-714-1, 714-714-2, 714-714-3, 714-714-4, 714-714-5, 714-714-6, 714-714-7, 714-714-8, 714-715-1, 714-715-2, 714-715-3, 714-715-4, 714-715-5, 714-715-10, 714-715-11, 714-715-12, 714-715-13, 714-715-15, 714-715-20, 714-732, 714-732-1, 714-732-2, 714-761-2, 714-761-3, 714-761-4, 714-895-1, 714-895-3

Kids' Choice®

Imagination Panels & Activity Panels

MATERIALS (continued)

Steering Wheel:	The steering wheel on vehicle-themed panels shall be constructed of a high density polyethylene produced from high performance U.V. stabilized rotational molding grade resins with a comprehensive additive package. These resins are tested in accordance with ASTM testing procedures D-1505, D-1248, D-1693 (b), D-638, D-790 and D-746. Resin's properties shall exhibit a balance of toughness, rigidity, environmental stress crack resistance and excellent low temperature impact performance. Wall thickness shall be 1/8". The steering wheel hub cover shall be constructed of injection molded polypropylene which shall contain U.V. light stabilizers. Models 714-714-6 and 714-714-7 Pilot Panels shall each contain two side-by-side steering wheels for cooperative play.
Star Brackets:	Themed for Space Ship Panel, star brackets will be constructed of 11 ga. HRPO steel and powder coat painted.
Fasteners:	Each assembly shall contain <u>Versalok Fasteners</u> and <u>Fastener Style A</u> hardware.
Finishes:	The panels and steering wheels shall have molded-in color. Each panel assembly shall have a two-color scheme. The rung brackets and clamps shall have a <u>Mira-Cote</u> finish.

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

Kids' Choice®
Electronic Panels

714-715-16
Electronic Piano Panel



714-715-17
Electronic Animal Panel



DESCRIPTION

These deck-mounting electronic activity panels are designed to enhance imagination and creative play. Panels play either music or animal noises to incorporate sound and learning into any playground theme.

MATERIALS

Panels: The panels shall be constructed of Mira-Lene with all corners rounded. The panels shall measure 36-1/2" x 40" and designs routed in the front and back.

Rung/Brackets: The rung shall be constructed of 1" pipe Gator Grip, bracket tabs shall be constructed of 11 ga. A-60 Galvannealed sheet, all solid welded.

Batteries: Each assembly shall contain three (3) "D" size alkaline batteries.

Fasteners: Each assembly shall contain Versalok Fasteners and Fastener Style A hardware.

Finishes: The rung brackets and clamps shall have a Mira-Cote finish.

Electronic Panels

714-715-16, 714-715-17

Kids' Choice® - Mira-Therm II
Bridge Wide Burma - 8', 4' and 12' MT II

714-723-W9

Bridge Wide Burma 8' MT II



714-723-4W9

Bridge Wide Burma 4' MT II



714-723-12W9

Bridge Wide Burma 12' MT II



<u>MODEL</u>	<u>PRODUCT</u>	<u>GROUND SPACE</u>	<u>CONCRETE</u>
714-723-W9	Bridge Wide Burma 8' MT II	4'-2" x 8'	N/A
714-723-4W9	Bridge Wide Burma 4' MT II	4'-1" x 4'	N/A
714-723-12W9	Bridge Wide Burma 12' MT II	4'-2" x 12'	N/A

DESCRIPTION

These Bridge Wide Burma - 8', 4' and 12' MT II assemblies provide a stable means of traversing between decks of equal height. The 8' and 4' MT II comprise one bridge section, spoked handrails and clamps; the 12' MT II comprises two (2) bridge sections, spoked handrails and clamps.

MATERIALS

Bridge Assembly: Each bridge section, measuring approximately 22" wide by 4', 6' or 8', shall be constructed with 11 ga. steel sheet perforated with a staggered pattern of 3/8" diameter holes at 5/8" apart center-to-center. The ramp frame shall be constructed by folding edges to form 3" tall walls and shall be supported by solid welded braces of 3/16" x 2" flat.

Handrails: Each handrail assembly shall be constructed of top and bottom rails with spoked infill, bolting tabs, and curved end rails with spokes, all solid welded. The bolting tabs shall be constructed of 7 ga. A-60 Galvannealed sheet. The top and bottom rails shall be constructed of 1" pipe with spokes and endrails of 1" tube.

Fasteners: The assembly shall contain Versalok Fasteners and Fastener Style A hardware.

Finishes: The bridge sections shall be finished in Mira-Therm. The handrails and clamps shall be finished in Mira-Cote.

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

Bridge Wide Burma - 8', 4' and 12' MT II

714-723-W9, 714-723-4W9, 714-723-12W9



MIRACLE
RECREATION EQUIPMENT COMPANY

Product Specifications

April 30, 2004

Rev. G

Kids' Choice®

Dupli-Gator® Slide and Dupli-Gator® Climber

714-771-6S and 714-771-6C

Dupli-Gator® Slide



Dupli-Gator® Climber



Dupli-Gator

714-771-6S, 714-771-6C

Kids' Choice®
Dupli-Gator® Slide and Dupli-Gator® Climber

<u>MODEL #</u>	<u>PRODUCT</u>	<u>GROUND SPACE</u>	<u>PROTECTIVE AREA</u>	<u>CONCRETE</u>
714-771-6S	Dupli-Gator Slide	12'-2" x 5'-0"	27'-5" x 17'-3"	0.20 cu. yds.
714-771-6C	Dupli-Gator Climber	11'-7" x 4'-9"	24'-1" x 17'-1"	0.20 cu. yds.

DESCRIPTION

The Dupli-Gator Slide/Climber, for attachment to 6' and 6'-6" decks, may be utilized in either of two ways: as a curving side-by-side slide or as a challenging climber resembling a partially-submerged alligator. The slide model contains transitional canopy and the climber model contains an arch entry enclosure.

MATERIALS

Slide/Climber: The one-piece slide/climber shall be constructed of double-wall Rockite with each wall being 1/4" to 3/8" thick. The body shall measure approximately 11' long by 3'-4" wide with a 15-1/2" offset at opposite end. Total thickness of the body shall be approximately 14-1/2". Both mogul slide bedways with smooth curves shall measure approximately 16-5/8" wide by 6" deep by 11' long. The slide/climber shall weigh approximately 180 lbs.

Canopy and Rung:
 # 714-771-6S only The canopy shall be constructed of double-wall Rockite with threaded fasteners incorporated for assembly. The canopy shall have an inside width of 39" and an outside width of 44" and shall be slanted at 37 degrees. It shall be field-attached to the posts via clamps and a 41-1/2" rung of 1" pipe.

Arch Enclosure:
 # 714-771-6C only The arch entry enclosure shall consist of top and bottom supports and an arched upright of 1" pipe, formed, mashed and punched, and vertical rungs of 1" tube, all solid welded.

Front Leg: The front leg shall be constructed of drilled and formed 1" pipe.

Bracket: The bracket used to field assemble front leg to slide/climber shall be constructed of drilled flat 1/2" x 1-1/2" and 3/8" HR round, solid welded.

Middle Legs: The legs shall be constructed of drilled and formed 1-1/2" pipe, mashed at top end for field attachment to castings and slide/climber.

Leg Castings: The leg castings shall measure approximately 5" x 14" x 2" and shall be aluminum alloy.

Fasteners: The assembly shall contain Versalok Fasteners and Fastener Style A hardware.

Finishes: The slide/climber and canopy shall have color molded in. The enclosure, rung, middle legs, front leg, leg castings, bracket, and clamps shall have a Mira-Cote finish.

Consult Miracle's "Glossary of Technical Data for Materials, Processes and Finishes" for specifications of underlined items.

Kids' Choice®
Bell, Post Mount

714796P1

Bell, Post Mount



Bell, Post Mount

<i>Model #</i>	<i>Product</i>	<i>Protective Area</i>	<i>Ground Space</i>	<i>Concrete</i>
714796P1	BELL, POST MOUNT	none	1' x 1'	none

714796P1

Kids' Choice®

Bell, Post Mount**DESCRIPTION**

This post mount Bell is designed to add noisy, imaginative play to any pre-existing deck post.

MATERIALS

Bell Assembly	The Bell Assembly shall consist of a Bell, a Bell Support, a 7-link Chain, an eyebolt, and <u>Fastener Style A</u> hardware. The Bell shall be constructed of <u>A-60 Galvannealed</u> . The Bell Support shall be constructed of <u>1" Pipe</u> , <u>Gator Grip</u> . The Bell Chain shall be constructed of 1/4" diameter, 316 stainless steel chain. The Eyebolt shall be 3/8" diameter zinc plated steel. The Bell shall be assembled to <u>1" Pipe</u> , <u>Gator Grip</u> .
Finishes	The Bell shall have a <u>Mira-Cote™</u> finish

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.



Product Specifications

April 14, 2005

Rev. C

MIRACLE
RECREATION EQUIPMENT COMPANY

Kids' Choice® - Mira-Therm II

ADA Stairs Between Decks - 1', 2', 2'-6" & 1'-6" Rise

714-810-9 & 714-959-9

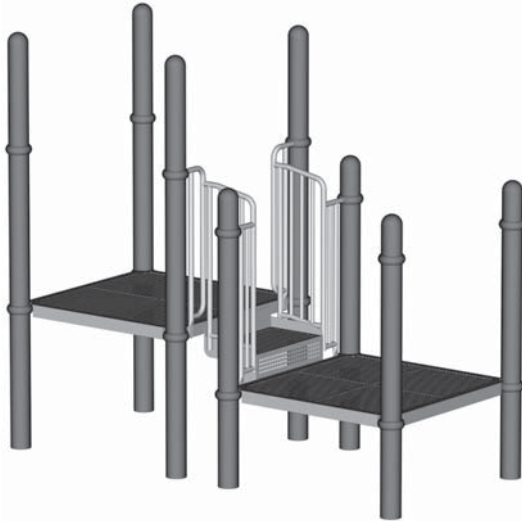
714-959-59 & 714-959-49

714-959-459

5 additional stair models

Stair (ADA) - 1' Rise Between Decks with Spoked Handrails, 1'-4" Span

Stair (ADA) - 2' Rise Between Decks with Spoked Handrails, 4'-6" Span



714-810-9 & 714-959-9

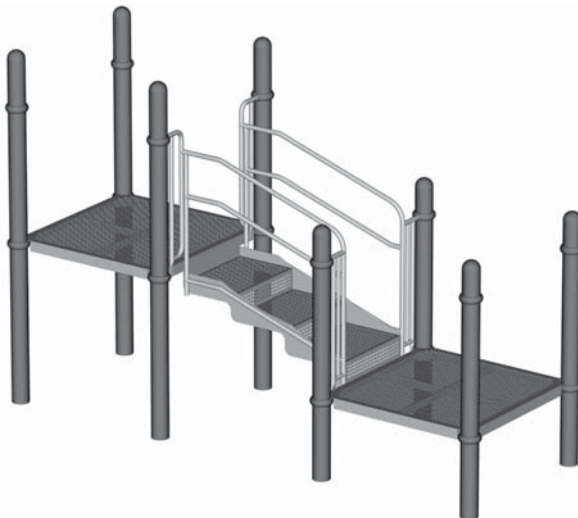
714-959-59 & 714-959-49

714-959-459

5 additional stair models

Stair (ADA) - 2' Rise Between Decks with Open Handrails, 4'-6" Span

Stair (ADA) - 2' Rise Between Decks with Spoked Handrails, 4'-0" Span



ADA Stairs Between Decks

714-810-9, 714-959-9, 714-959-59, 714-959-49, 714-959-459, 714-960-9, 714-993-9, 714-993-59, 714-993-49, 714-993-459

Kids' Choice® - Mira-Therm II
ADA **Stairs Between Decks**

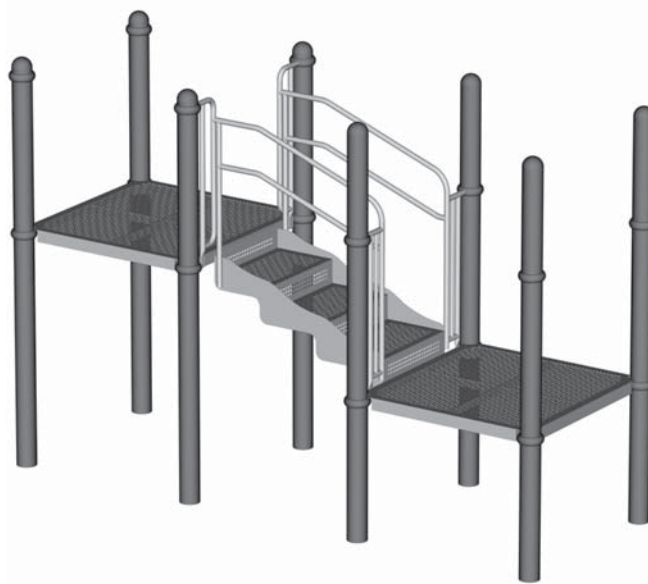
714-810-9 & 714-959-9

714-959-59 & 714-959-49

714-959-459

5 additional
stair models

**Stair (ADA) - 2' Rise Between Decks
with Open Handrails, 4'-0" Span**



5 additional
stair models

714-960-9

714-993-9 & 714-993-59

714-993-49 & 714-993-459

**Stair (ADA) - 2'-6" Rise Between Decks
with Spoked Handrails, 6'-0" Span**





Kids' Choice® - Mira-Therm II
ADA **Stairs Between Decks**

5 additional
stair models

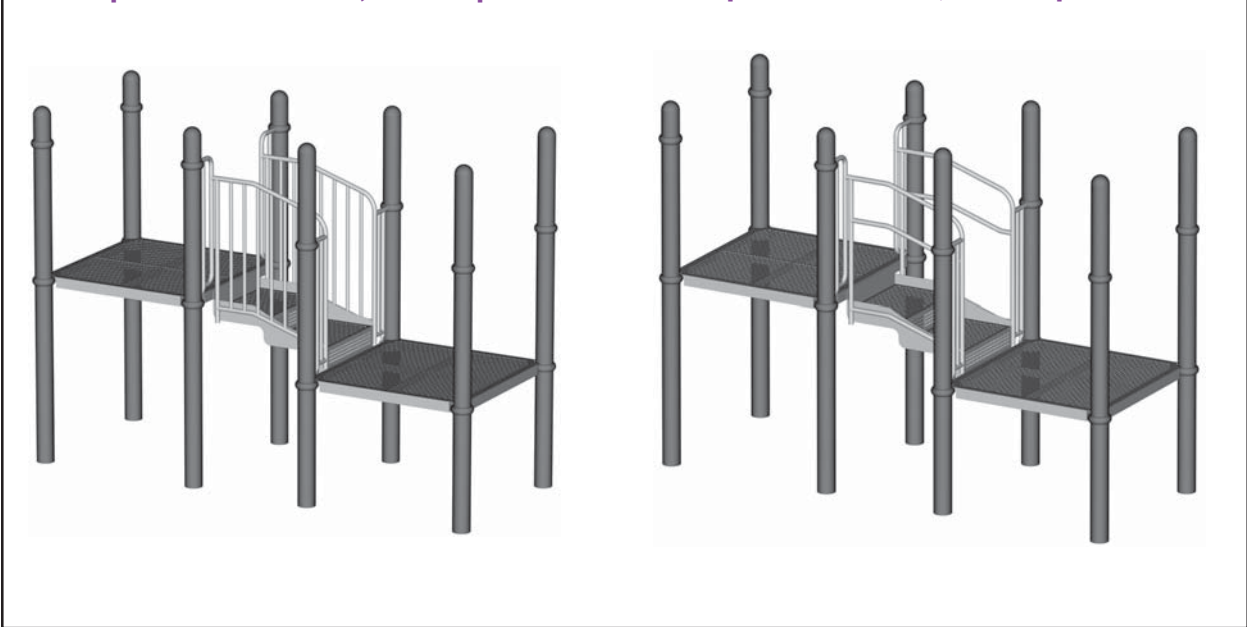
714-960-9

714-993-9 & 714-993-59

714-993-49 & 714-993-459

Stair (ADA) - 1'-6" Rise Between Decks with Spoked Handrails, 3'-0" Span

Stair (ADA) - 1'-6" Rise Between Decks with Open Handrails, 3'-0" Span



5 additional
stair models

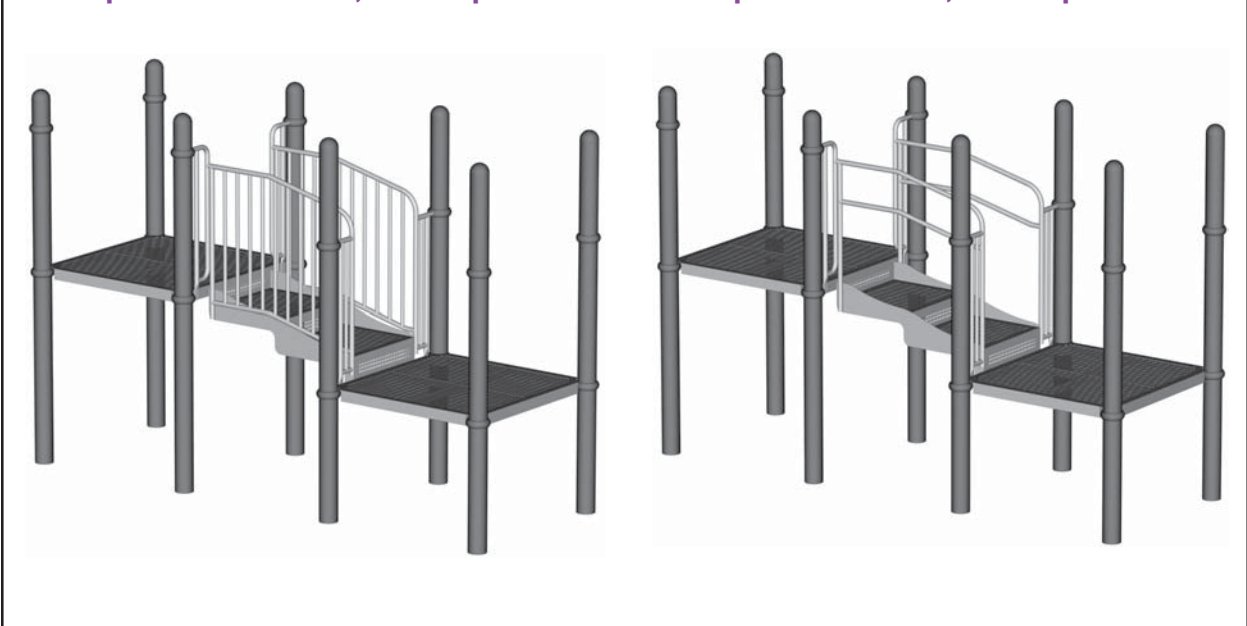
714-960-9

714-993-9 & 714-993-59

714-993-49 & 714-993-459

Stair (ADA) - 1'-6" Rise Between Decks with Spoked Handrails, 4'-0" Span

Stair (ADA) - 1'-6" Rise Between Decks with Open Handrails, 4'-0" Span



ADA Stairs Between Decks

714-810-9, 714-959-9, 714-959-59, 714-959-49, 714-959-459, 714-960-9, 714-993-9, 714-993-59, 714-993-49, 714-993-459

Kids' Choice® - Mira-Therm II
ADA Stairs Between Decks

<u>MODEL #</u>	<u>PRODUCT</u>
714-810-9	ADA Stair Between Decks, 1' Rise, Spoked Handrails, 1'-4" Span
714-959-9	ADA Stairs Between Decks, 2' Rise, Spoked Handrails, 4'-6" Span
714-959-59	ADA Stairs Between Decks, 2' Rise, Open Handrails, 4'-6" Span
714-959-49	ADA Stairs Between Decks, 2' Rise, Spoked Handrails, 4'-0" Span
714-959-459	ADA Stairs Between Decks, 2' Rise, Open Handrail, 4'-0" Span
714-960-9	ADA Stairs Between Decks, 2'-6" Rise, Spoked Handrails, 6'-0" Span
714-993-9	ADA Stairs Between Decks, 1'-6" Rise, Spoked Handrails, 3'-0" Span
714-993-59	ADA Stairs Between Decks, 1'-6" Rise, Open Handrails, 3'-0" Span
714-993-49	ADA Stairs Between Decks, 1'-6" Rise, Spoked Handrails, 4'-0" Span
714-993-459	ADA Stairs Between Decks, 1'-6" Rise, Open Handrails, 4'-0" Span

DESCRIPTION

These ADA-compliant stairs connect decks of differing heights and include handrails.

MATERIALS

- Steps:** The wide step assemblies, approximately 26-3/8" before PVC-dip coating, shall be constructed of steel stringers solid welded to formed treads of 11 ga. steel sheet that are perforated with a staggered pattern of 3/8" diameter holes at 5/8" apart center-to-center. The braces shall be constructed of 11 ga. black.
- Spoked Handrails:** Spoked handrail enclosures shall consist of a top and bottom rail and newel post, all of 1" pipe, and uprights of 3/4" x 1" oval tube, all solid welded. The top rails shall contain 3/8" aluminum inserts. Plastic pipe plugs shall close open ends.
- Open Handrails:** Open handrail enclosures shall consist of a top and bottom rail and newel post, all of 1" pipe, solid welded. The top rails shall contain 3/8" aluminum inserts. Plastic pipe plugs shall close open ends.
- Top Stair Enclosure:** The top stair enclosure shall consist of enclosure rails and an upright, both of 1" pipe, drilled and solid welded. The upright shall be mashed on one end.
- Bottom Deck Enclosure:** The bottom deck enclosure shall consist of enclosure rails and an upright of 1" pipe, drilled, and a spoke of 3/4" x 1" oval tube, all solid welded. The upright shall be mashed on one end. Plastic pipe plugs shall close open ends.
- Fasteners:** The assembly shall contain Versalok Fasteners and Fastener Style A hardware.
- Finishes:** The stairs shall be finished in Mira-Therm. The handrails, enclosures, and clamps shall have a Mira-Cote finish.

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

714-810-9, 714-959-9, 714-959-59, 714-959-49, 714-959-459, 714-960-9, 714-993-9, 714-993-59, 714-993-49, 714-993-459

Kids' Choice®
Deck Enclosures

714-813-1

One-Sided Deck Enclosure

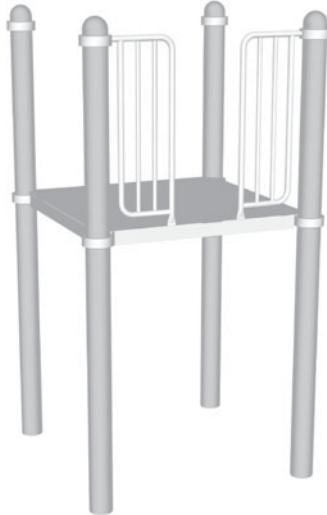
Model mounts vertically on Deck system on Post opposite Post to which Horseshoe Climber (Model # 714-776-5) is mounted.



714-813-5

Deck Enclosure

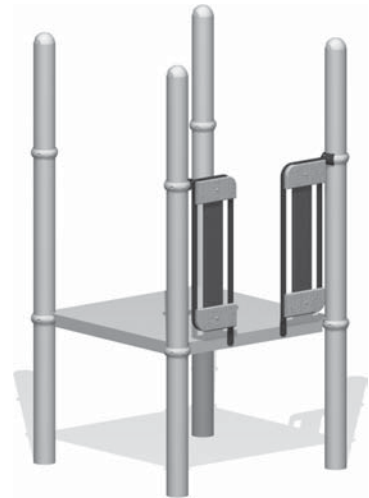
Model mounts vertically on Deck systems at either or both ends of Overhead Climber component



714-813-5R1

Nature Deck Enclosure

Model mounts vertically on Deck systems at either or both ends of Overhead Climber component



<u>MODEL #</u>	<u>PRODUCT</u>	<u>CONCRETE</u>	<u>GROUND SPACE</u>
714-813-1	One-Sided Deck Enclosure	N/A	N/A
714-813-5	Deck Enclosure	N/A	N/A
714-813-5R1	Nature Deck Enclosure	N/A	N/A

DESCRIPTION

The standard deck enclosures are basic accessories for overhead climber systems, typically installed at either end on a deck system or between deck posts, respectively. The one sided deck enclosure is mounted on deck system for use only with Horseshoe Climber, Model # 714-767, which may be mounted to any corner post of a 4' deck.

Consult Miracle's "Glossary of Technical Data for Materials, Processes and Finishes" for definitions of the underlined items.

Deck Enclosures

714-813-1, 714-813-5

Kids' Choice® Deck Enclosures

MATERIALS

- Deck Enclosure (Standard): The deck enclosure shall consist of two pieces, each comprising enclosure rails and uprights. The enclosure rails shall be constructed of 1" pipe, drilled, with plastic pipe plugs inserted in open end (at post) and mashed at deck end. The uprights shall be constructed of 3/4" x 1" oval tube. The entire assembly shall be solid welded.
- Deck Enclosure (One-Sided): The one-sided deck enclosure shall comprise enclosure rails and uprights. The enclosure rails shall be constructed of 1" pipe, drilled and mashed at deck end. The uprights shall be constructed of 3/4" x 1" oval tube. The entire assembly shall be solid welded.
- Deck Enclosure (Nature Deck): The nature deck enclosure shall comprise rails constructed of 1" pipe drilled and mashed at deck end and fully welded. Brackets of 11 ga. galvanized sheet steel are stitch welded to the 1" pipe frame. Boards of 1" x 5.5" recycled plastic and wood composite are fastened to the frame with Fastener Style A hardware.
- Fasteners: All Versalok Fasteners for deck and component attachment shall be aluminum alloy. All hardware shall be Fastener Style A.
- Finishes: The deck enclosures and Versalok Fasteners shall have a Mira-Cote finish.

**Kids' Choice®
Wave Barriers**
714-816W
Wave Barrier, Full Bar

714-8161W
Wave Barrier, Full Mesh

Wave Barriers
MODEL #

 714-816-W
714-816-1W

PRODUCT

 Wave Barrier, Full Bar
Wave Barrier, Full Mesh

DESCRIPTION

The Wave Barrier is designed to provide fall protection on Kids' Choice Deck systems.

MATERIALS
Bar Barrier:

The barrier shall comprise a frame with uprights and rungs of 1.315" O.D. x 14 ga. galvanized, embossed tubing, fully welded. Brackets of 11 ga. galvanized sheet steel are stitch welded to the tubing to complete the frame. Top Barrier shall be Mira-Therm.

Mesh Barrier:

The barrier shall comprise a frame with uprights and rungs of 1.315" O.D. x 14 ga. galvanized, embossed tubing, fully welded. Brackets of 11 ga. galvanized sheet steel are stitch welded to the tubing to complete the frame. Top Barrier shall be Mira-Therm. Mesh shall be constructed of galvanized welded wire, 0.224" dia.

Fasteners:

The assembly shall contain Versalok Fasteners and Fastener Style A hardware.

Finishes:

The frame and clamps shall have a Mira-Cote finish. The Top Barrier shall be available in Mira-Therm finishes.

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

714-816W, 714-8161W

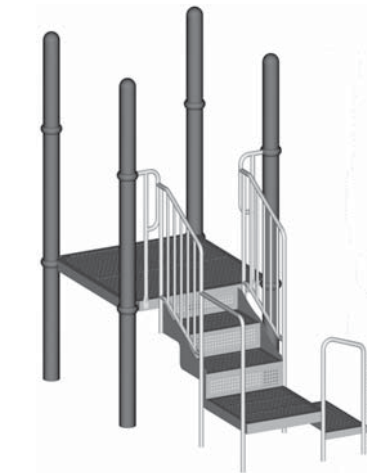
Kids' Choice® - Mira-Therm II™

Square Transfer Points - 3', 4', 5', 6' & 6'-6" Decks with Closed or Open Handrails

Deck systems not included in these assemblies.

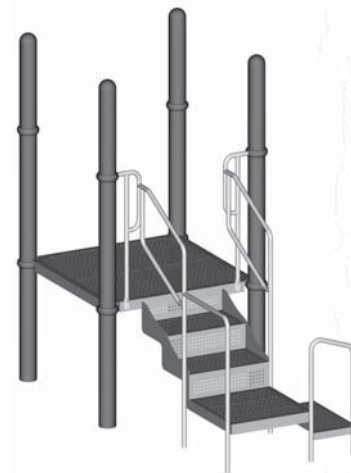
714-851-39

Square Transfer Point for 3' Deck, Closed
Bottom step to exit LEFT



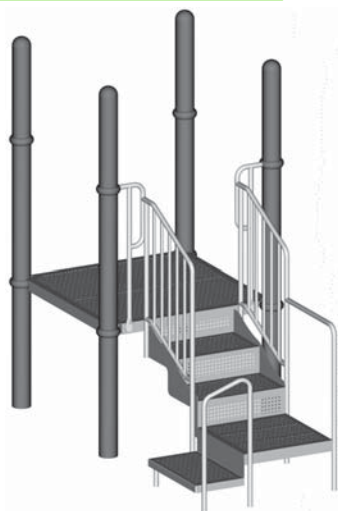
714-851-359

Square Transfer Point for 3' Deck, Open
Bottom step to exit LEFT



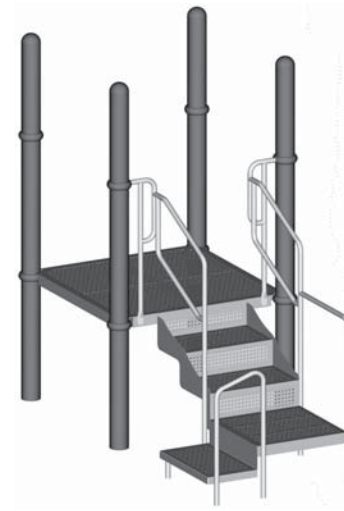
714-851-39

Square Transfer Point for 3' Deck, Closed
Bottom step to exit RIGHT



714-851-359

Square Transfer Point for 3' Deck, Open
Bottom step to exit RIGHT



Square Transfer Points

714-851-39, 714-851-359, 714-851-49, 714-851-459, 714-851-59, 714-851-69

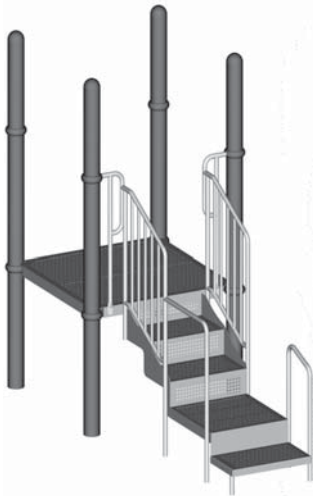
Kids' Choice® - Mira-Therm II™

Square Transfer Points - 3', 4', 5', 6' & 6'-6" Decks with Closed or Open Handrails

Deck systems not included in these assemblies.

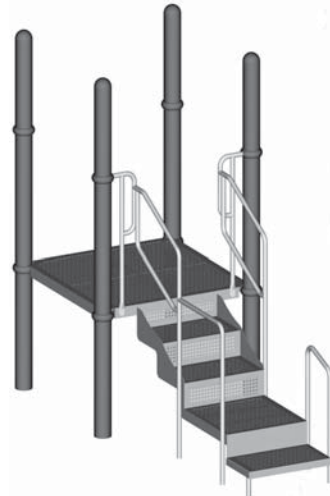
714-851-39

Square Transfer Point for 3' Deck, Closed Bottom step to exit STRAIGHT with handrail on LEFT



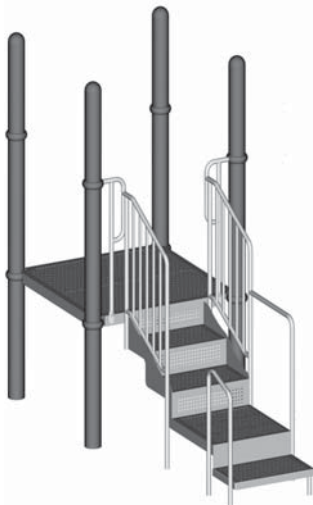
714-851-359

Square Transfer Point for 3' Deck, Open Bottom step to exit STRAIGHT with handrail on LEFT



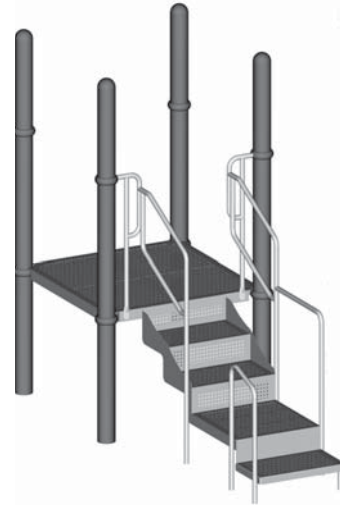
714-851-39

Square Transfer Point for 3' Deck, Closed Bottom step to exit STRAIGHT with handrail on RIGHT



714-851-39

Square Transfer Point for 3' Deck, Open Bottom step to exit STRAIGHT with handrail on RIGHT

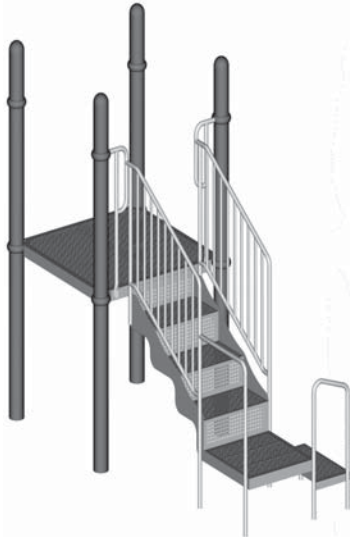
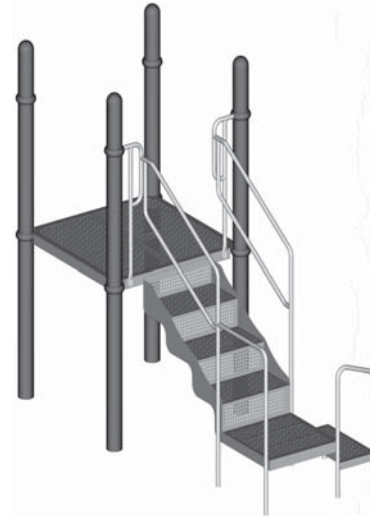
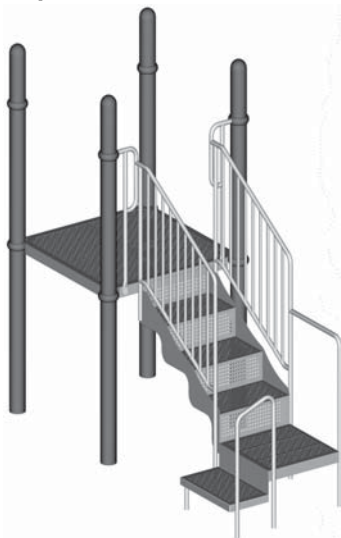
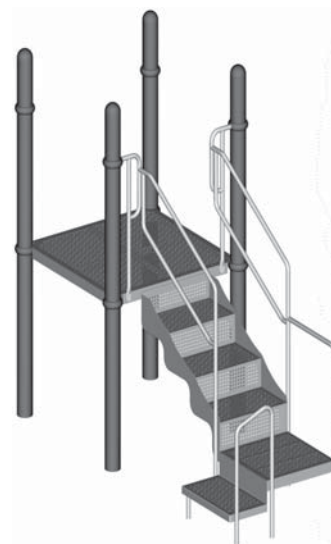


714-851-39, 714-851-359, 714-851-49, 714-851-459, 714-851-59, 714-851-69

Kids' Choice® - Mira-Therm II™

Square Transfer Points - 3', 4', 5', 6' & 6'-6" Decks with Closed or Open Handrails

Deck systems not included in these assemblies.

714-851-49
**Square Transfer Point for 4' Deck, Closed
Bottom step to exit LEFT**

714-851-459
**Square Transfer Point for 4' Deck, Open
Bottom step to exit LEFT**

714-851-49
**Square Transfer Point for 4' Deck, Closed
Bottom step to exit RIGHT**

714-851-459
**Square Transfer Point for 4' Deck, Open
Bottom step to exit RIGHT**


Kids' Choice® - Mira-Therm II™

Square Transfer Points - 3', 4', 5', 6' & 6'-6" Decks with Closed or Open Handrails

Deck systems not included in these assemblies.

714-851-49

Square Transfer Point for 4' Deck, Closed Bottom step to exit STRAIGHT with handrail on LEFT



714-851-459

Square Transfer Point for 4' Deck, Open Bottom step to exit STRAIGHT with handrail on LEFT



714-851-49

Square Transfer Point for 4' Deck, Closed Bottom step to exit STRAIGHT with handrail on RIGHT



714-851-459

Square Transfer Point for 4' Deck, Open Bottom step to exit STRAIGHT with handrail on RIGHT



Kids' Choice® - Mira-Therm II™

Square Transfer Points - 3', 4', 5', 6' & 6'-6" Decks with Closed or Open Handrails

Deck systems not included in these assemblies.

714-851-59
Square Transfer Point for 5' Deck, Closed Bottom step to exit LEFT

714-851-59
Square Transfer Point for 5' Deck, Closed Bottom step to exit RIGHT

714-851-59
Square Transfer Point for 5' Deck, Closed Bottom step to exit STRAIGHT with handrail on LEFT

714-851-59
Square Transfer Point for 5' Deck, Closed Bottom step to exit STRAIGHT with handrail on RIGHT


Square Transfer Points

Kids' Choice® - Mira-Therm II™

Square Transfer Points - 3', 4', 5', 6' & 6'-6" Decks with Closed or Open Handrails

Deck systems not included in these assemblies.

714-851-69

Square Transfer Point for 6' & 6'-6"
Deck, Closed
Bottom step to exit LEFT



714-851-69

Square Transfer Point for 6' & 6'-6"
Deck, Closed
Bottom step to exit RIGHT



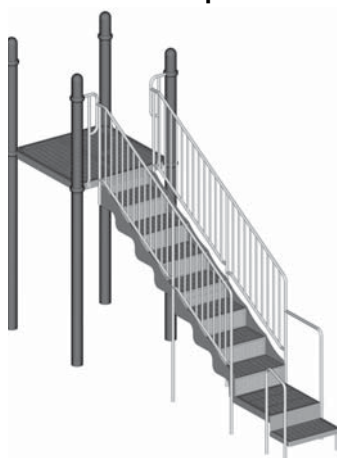
714-851-69

Square Transfer Point for 6' & 6'-6"
Deck, Closed
Bottom step to exit STRAIGHT



714-851-69

Square Transfer Point for 6' & 6'-6"
Deck, Closed
Bottom step to exit STRAIGHT



714-851-39, 714-851-359, 714-851-49, 714-851-459, 714-851-59, 714-851-69

Kids' Choice® - Mira-Therm II™

Square Transfer Points - 3', 4', 5', 6' & 6'-6" Decks with Closed or Open Handrails

Deck systems not included in these assemblies.

<u>MODEL #</u>	<u>PRODUCT</u>	<u>ORIENTATION</u>	<u>GRND. SPC.</u>	<u>PROT. AREA</u>	<u>CONCRETE</u>
714-851-39	Sqr. Transfer Point, 3' Dk, Closed	Left or Right ...	4'-9" x 4'-0"	17'-2" x 16'-0"	0.30 cu. yds.
		Straight ...	5'-10" x 3'-6"	18'-3" x 14'-11"	0.30 cu. yds.
714-851-359	Sqr. Transfer Point, 3' Dk, Open	Left or Right ...	4'-9" x 4'-0"	17'-2" x 16'-0"	0.30 cu. yds.
		Straight ...	5'-10" x 3'-6"	18'-3" x 14'-11"	0.30 cu. yds.
714-851-49	Sqr. Transfer Point, 4' Dk, Closed	Left or Right ...	5'-11" x 4'-1"	18'-4" x 16'-0"	0.30 cu. yds.
		Straight ...	7'-0" x 3'-6"	19'-5" x 14'-11"	0.30 cu. yds.
714-851-459	Sqr. Transfer Point, 4' Dk, Open	Left or Right ...	5'-11" x 4'-1"	18'-4" x 16'-0"	0.30 cu. yds.
		Straight ...	7'-0" x 3'-6"	19'-5" x 14'-11"	0.30 cu. yds.
714-851-59	Sqr. Transfer Point, 5' Dk, Closed	Left or Right ...	8'-3" x 4'-0"	20'-9" x 16'-0"	0.30 cu. yds.
		Straight ...	9'-4" x 3'-6"	21'-10" x 14'-11"	0.30 cu. yds.
714-851-69	Sqr. Transfer Point, 6' Dk, Closed	Left or Right ...	10'-8" x 4'-1"	23'-1" x 16'-0"	0.40 cu. yds.
		Straight ...	11'-9" x 3'-6"	24'-2" x 14'-11"	0.40 cu. yds.

DESCRIPTION

These models are designed to assist disabled users gain access to and egress from a deck system.

MATERIALS

- Stair Assembly:** Each stair assembly shall be constructed of 11 ga. steel stringers solid welded to 11 ga. steel sheet decking that is perforated in a staggered pattern of 3/8" diameter holes at 5/8" apart center-to-center. Approximate dimensions of stair assembly shall be 26" overall width, 14" deep step tread and 8" high step rise.
- Transfer Point Deck:** Each 26" square (approximate) transfer point deck shall be constructed of 11 ga. steel sheet folded to form approximately 3" high sidewalls. The decking shall be perforated in a staggered pattern of 3/8" diameter holes at 5/8" apart center-to-center. It shall be reinforced with cross braces of 3/16" x 2" HR flat solid welded.
- Bottom Step:** The bottom step shall be constructed of 11 ga. steel sheet (with folded edges) perforated in an identical pattern. The step shall be approximately 26" wide by 14" deep by 6-1/2" high.
- Deck Enclosures:** Deck enclosures shall be constructed of formed 1" pipe, including a welded upright of the same material. Each assembly shall be drilled for field assembly of a stair handrail, and shall have its bottom end mashed and punched for field assembly to deck.

Kids' Choice® - Mira-Therm II™

Square Transfer Points - 3', 4', 5', 6' & 6'-6" Decks with Closed or Open Handrails

Deck systems not included in these assemblies.

MATERIALS (continued)

Stair Handrail and Stair/Deck Handrail:

Stair handrail assemblies shall be welded upper and lower handrails of formed 1" pipe. Closed handrails shall contain vertical uprights of 3/4" x 1" oval tube welded within. Swaged handrail extensions for field assembly to handrails shall be constructed of 1" pipe. A transfer deck handrail constructed of formed 1" pipe shall be field assembled to one handrail newel upright and transfer point deck edge. Models designed for assembly to 5' and 6' or 6'-6" decks shall contain handrail sleeve supports constructed of 1-1/4" pipe, 10 ga.

Transfer Step Handrail:

The "U"-shaped transfer step handrail shall be formed 1" pipe, drilled for field assembly to transfer point deck and bottom step. Its apex shall be 36-1/8" from finished grade.

Rung Leg:

The rung leg shall be 1" pipe with ends mashed and punched for field assembly to bottom step.

Fasteners:

Each assembly shall contain Versalok Fasteners and Fastener Style A hardware.

Finishes:

The stairs, bottom step, and transfer point deck shall be finished in Mira-Therm. The deck enclosures, handrails, extensions, sleeves, and leg shall be finished in Mira-Cote.

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.



Kids' Choice® - Mira-Therm II

4' Level Bridge MT II, 4' and 12' Arch Bridges MT II

714-856-49

Bridge 4' Level Between Decks MT II



714-970-49

Arch Bridge 4' Between Decks MT II



714-970-129

Arch Bridge 12' MT II



MODEL

714-856-49

714-970-49

714-970-129

PRODUCT

Bridge 4' Level Between Decks MT II

Arch Bridge 4' Between Decks MT II

Arch Bridge 12' MT II

GROUND SPACE

4'-0" X 4'-0"

4'-0" X 4'-0"

4'-0" X 12'-0"

CONCRETE

NA

NA

NA

DESCRIPTION

These bridges are dynamic assemblies designed to permit users to travel between deck systems. Each model contains spoked handrails. The arched bridges meet 1:12 slope guidelines.

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

4' Level Bridge MT II, 4' and 12' Arch Bridges MT II

714-856-49, 714-970-49, 714-970-129

Kids' Choice® - Mira-Therm II

4' Level Bridge MT II, 4' and 12' Arch Bridges MT II

MATERIALS

Bridge and Arched Bridge Sections: The bridge and arched bridge sections shall be constructed with folded 11 ga. steel sheet forming 3" tall sides. Decking sheets shall be perforated with a staggered pattern of 3/8" diameter holes at 5/8" apart center-to-center. Braces shall be 1/4" x 1-1/2" flat. The entire assembly shall be solid welded.

Enclosure/Handrails: Each enclosure/handrail assembly shall consist of a top and bottom rail and spoked upright infill. The top and bottom rails shall be constructed of 1" pipe; the uprights shall be 1" tube. The assemblies shall be solid welded. End uprights (and middle uprights for Model # 714-970-129) shall have mashed and drilled bottom ends for field attachment to ramp or bridge assemblies.

Versalok Fasteners: Versalok Fasteners for deck and component attachment shall be aluminum alloy.

Fasteners: All fastening hardware shall be Fastener Style A.

Finishes: The enclosures and Versalok Fasteners shall be finished in Mira-Cote. The bridge sections shall be coated in Mira-Therm.

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.



Product Specifications

April 20, 2012

Rev. B

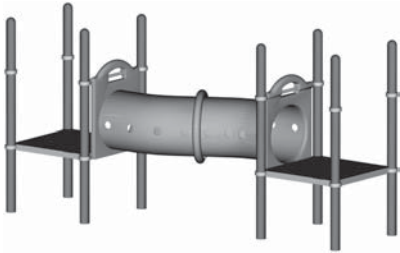
MIRACLE
RECREATION EQUIPMENT COMPANY

Kids' Choice®

30" I.D. Crawl Tubes - Offset (Left & Right), Dip, Hip & Inclined (8', 10' & 12')

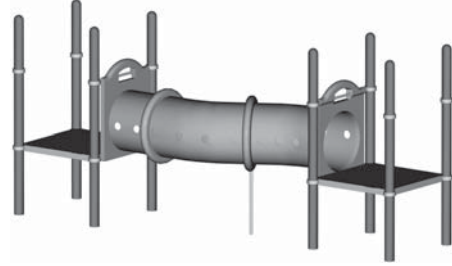
714-871-L8

Offset Crawl Tube, Left, 8' long



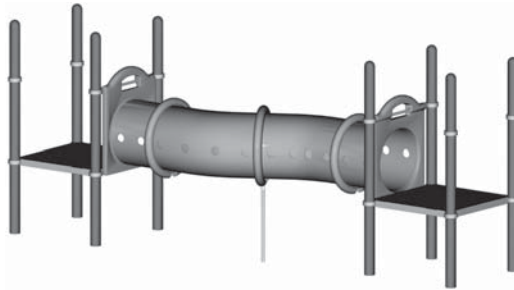
714-871-L10

Offset Crawl Tube, Left, 10' long



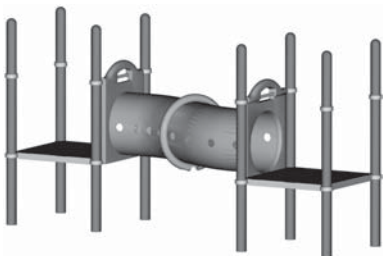
714-871-L12

Offset Crawl Tube, Left, 12' long



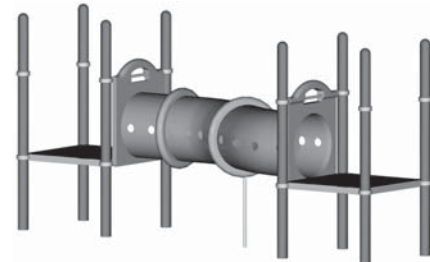
714-871-R8

Offset Crawl Tube, Right, 8' long



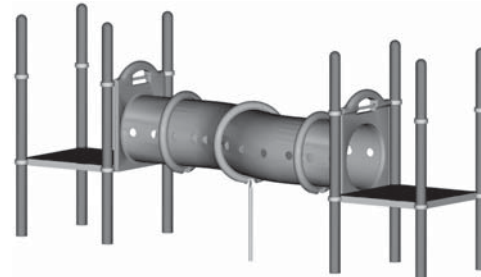
714-871-R10

Offset Crawl Tube, Right, 10' long



714-871-R12

Offset Crawl Tube, Right, 12' long



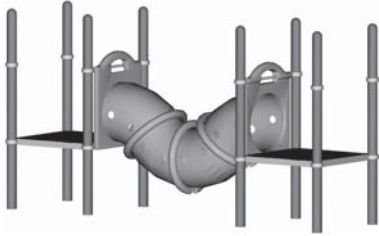
Crawl Tubes - Offset, Dip, Hip & Inclined

714-871-L8, 714-871-L10, 714-871-L12, 714-871-R8, 714-871-R10, 714-871-R12,
714-872-D8, 714-872-D10, 714-872-D12, 714-873-5, 714-872-H8, 714-872-H10,
714-872-H12, 714-873-5, 714-873-8, 714-873-10, 714-873-12

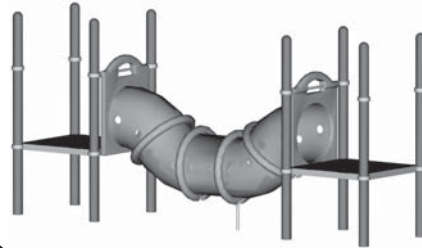
Crawl Tubes - Offset, Dip, Hip & Inclined

Kids' Choice®
30" I.D. Crawl Tubes

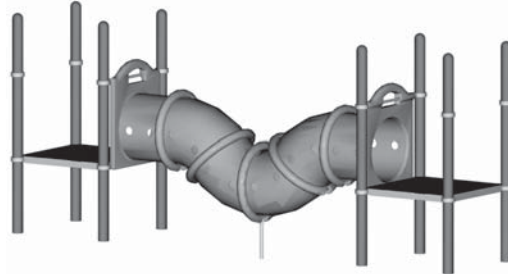
714-872-D8
Dip Crawl Tube, 8' long



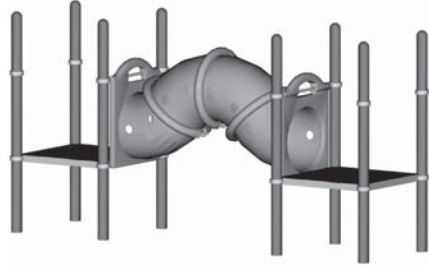
714-872-D10
Dip Crawl Tube, 10' long



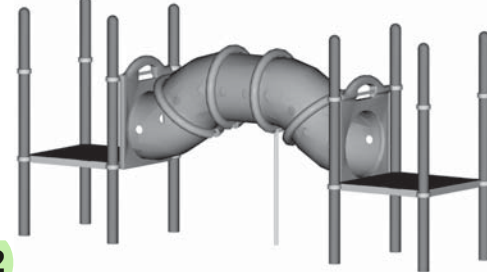
714-872-D12
Dip Crawl Tube, 12' long



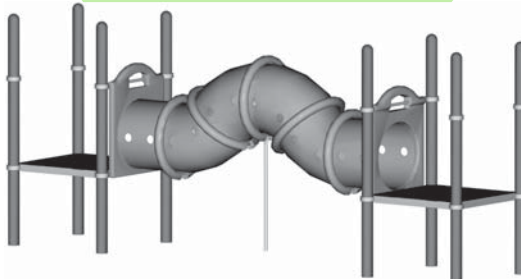
714-872-H8
Hip Crawl Tube, 8' long



714-872-H10
Hip Crawl Tube, 10' long



714-872-H12
Hip Crawl Tube, 12' long



714-871-L8, 714-871-L10, 714-871-L12, 714-871-R8, 714-871-R10, 714-871-R12,
714-872-D8, 714-872-D10, 714-872-D12, 714-873-5, 714-872-H8, 714-872-H10,
714-872-H12, 714-873-5, 714-873-8, 714-873-10, 714-873-12



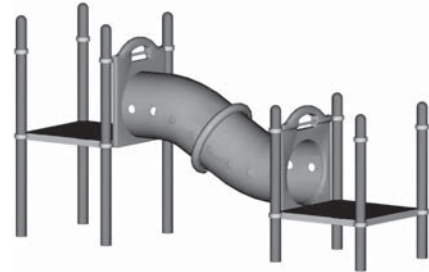
MIRACLE
RECREATION EQUIPMENT COMPANY

Kids' Choice®
30" I.D. Crawl Tubes

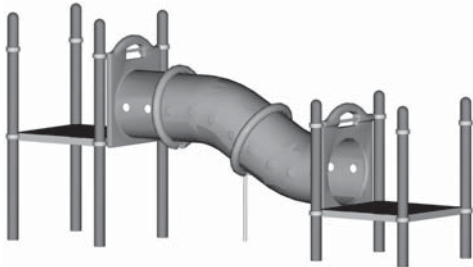
714-873-5
Inclined Crawl Tube, 5'-4" long, 3' Rise



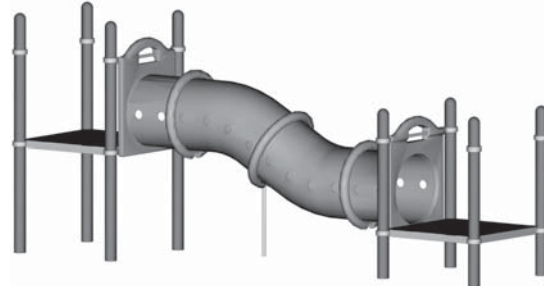
714-873-8
Inclined Crawl Tube, 8' long, 2' Rise



714-873-10
Inclined Crawl Tube, 10' long, 2' Rise



714-873-12
Inclined Crawl Tube, 12' long, 2' Rise



Crawl Tubes - Offset, Dip, Hip & Inclined

714-871-L8, 714-871-L10, 714-871-L12, 714-871-R8, 714-871-R10, 714-871-R12,
714-872-D8, 714-872-D10, 714-872-D12, 714-873-5, 714-872-H8, 714-872-H10,
714-872-H12, 714-873-5, 714-873-8, 714-873-10, 714-873-12

Kids' Choice®
30" I.D. Crawl Tubes

<u>MODEL #</u>	<u>PRODUCT</u>	<u>GROUND SPACE</u>	<u>PROTECTIVE AREA</u>	<u>CONCRETE</u>
714-871-L8	Offset Crawl Tube, Left, 8' long	8'-2" x 5'-6"	20'-8" x 17'-8"	none
714-871-L10	Offset Crawl Tube, Left, 10' long	10'-2" x 5'-6"	22'-8" x 17'-8"	.05 cu. yds.
714-871-L12	Offset Crawl Tube, Left, 12' long	12'-2" x 5'-6"	24'-8" x 17'-8"	.05 cu. yds.
714-871-R8	Offset Crawl Tube, Right, 8' long	8'-2" x 5'-6"	20'-8" x 17'-8"	none
714-871-R10	Offset Crawl Tube, Right, 10' long	10'-2" x 5'-6"	22'-8" x 17'-8"	.05 cu. yds.
714-871-R12	Offset Crawl Tube, Right, 12' long	12'-2" x 5'-6"	24'-8" x 17'-8"	.05 cu. yds.
714-872-D8	Dip Crawl Tube, 8' long	8'-2" x 3'-6"	20'-8" x 16'	none
714-872-D10	Dip Crawl Tube, 10' long	10'-2" x 3'-6"	22'-8" x 16'	.05 cu. yds.
714-872-D12	Dip Crawl Tube, 12' long	12'-2" x 3'-6"	24'-8" x 16'	.05 cu. yds.
714-872-H8	Hip Crawl Tube, 8' long	8'-2" x 3'-6"	20'-8" x 16'	none
714-872-H10	Hip Crawl Tube, 10' long	10'-2" x 3'-6"	22'-8" x 16'	.05 cu. yds.
714-872-H12	Hip Crawl Tube, 12' long	12'-2" x 3'-6"	24'-8" x 16'	.05 cu. yds.
714-873-5	Inclined Crawl Tube, 5'-4" long	5'-6" x 4'-4"	18'-2" x 16'-6"	none
714-873-8	Inclined Crawl Tube, 8' long	8'-2" x 3'-6"	20'-8" x 16'	none
714-873-10	Inclined Crawl Tube, 10' long	10'-2" x 3'-6"	22'-8" x 16'	.05 cu. yds.
714-873-12	Inclined Crawl Tube, 12' long	12'-2" x 3'-6"	24'-8" x 16'	.05 cu. yds.

DESCRIPTION

These crawl tubes with view holes provide children a fun and challenging means of traversing from one deck to another.

MATERIALS

Crawl Tube Assembly: All pieces shall be constructed of Rockite with a 30" inner diameter. Elbows shall have a 22" centerline radius. Tube-to-tube connections shall have a Rockite flange cover. The bedway shall have no exposed internal fasteners. The tube joints shall be externally flanged and overlapping, with a 1" wide flange. The entry panels shall be Rockite and shall measure 47" x 38" and shall include rungs of 1" pipe measuring 41". The Rockite wall thickness shall be approximately 1/4".

Support Leg: (10' & 12' models only) The support leg shall be die-formed 1-1/4" pipe.

Fasteners: The assembly shall contain Versalok Fasteners and Fastener Style A hardware.

Finishes: The rungs, support leg, and clamps shall be finished in Mira-Cote. The entry panels, tube sections and flange covers shall have color molded in.

Consult Miracle's "Glossary of Technical Data for Materials, Processes & Finishes" for specifications of underlined items.

714-871-L8, 714-871-L10, 714-871-L12, 714-871-R8, 714-871-R10, 714-871-R12, 714-872-D8, 714-872-D10, 714-872-D12, 714-872-H8, 714-872-H10, 714-872-H12, 714-873-5, 714-873-8, 714-873-10, 714-873-12



Product Specifications

March 26, 2004

Rev. B

MIRACLE
RECREATION EQUIPMENT COMPANY

Kids' Choice®

"L" Slide from 3' Deck; Right Exit

714-907-1

"L" Slide from 3' Deck; Right



"L" Slide

714-907-1

"L" Slide

Kids' Choice®
"L" Slide

<u>MODEL #</u>	<u>PRODUCT</u>	<u>OVERALL HT.</u>	<u>GRND. SPC.</u>	<u>PROT. AREA</u>	<u>CONCRETE</u>
714-907-1	"L" Slide from 3' Deck; Right Exit	6'-2"	5' x 5'	17' x 18'	.05 cu. yds.

DESCRIPTION

The "L" slide with canopy is designed to exit right from a 3' deck.

MATERIALS

Slide and Canopy Panel: The one-piece slide shall be constructed of double-wall Rockite and shall have 6-1/4" high side rails, an overall width of 25-5/8", and an 18" wide sliding surface. The canopy panel shall also be constructed of double-wall Rockite and shall be field mounted to deck and to post clamps via a 41-1/2" long rung constructed of 1" pipe.

Leg: The leg shall be 1-1/2" tube, welded to a 7 ga. A-60 Galvannealed mounting bracket.

Fasteners: The assembly shall contain Versalok Fasteners and Fastener Style A hardware.

Finishes: The rung, leg, and clamps shall have a Mira-Cote finish. The Rockite slide and canopy shall have molded-in color.

714-907-1

Consult Miracle's "Glossary of Technical Data for Materials, Processes and Finishes" for specifications of underlined items.

Champions Trek™ Tapered Tower



Champions Trek™ Tapered Tower

<u>MODEL</u>	<u>PRODUCT</u>	<u>GROUND SPACE</u>	<u>PROTECTIVE AREA</u>	<u>CONCRETE</u>
454-4	Tapered Tower	7' x 3'	19' x 15'	1.20 cu. yds.

DESCRIPTION

The Tapered Tower is a challenging climber, with sturdy ropes and handholds, that allow children to practice balance while increasing upper and lower body strength. The climber is designed to be freestanding or can be attached to a deck.

MATERIALS

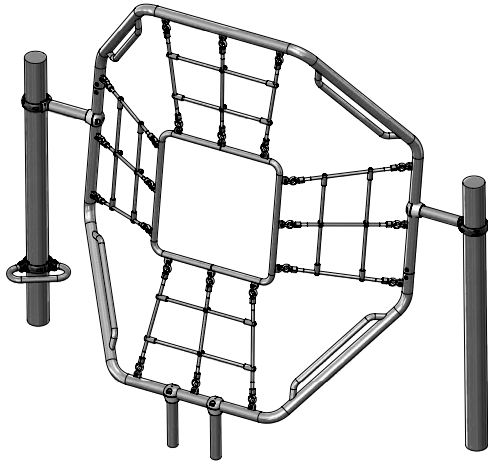
Frame:	Frame sides shall be made from: outer "ribbon" edge 3-1/2" 8ga. tubing; inner "ribbon" edge 2-3/8" 12ga. tubing; horizontal legs 2-3/8" 12ga. tubing; inner rungs - <u>1" pipe</u> ; panel frame plate 7ga. sheet steel; blocks - mild steel.
Joiners:	Joiners shall be made from <u>1" pipe</u> and panel frame plates 7ga. sheet steel.
Net Anchor:	Net Anchor shall be made from <u>1" pipe</u> and steel wire "U" loops.
Wall Panels:	Panels shall be made from 11ga. sheet steel.
Handholds: (Lg. and Sm.)	Shall be cast alloyed aluminum.
Ropes:	Ropes shall be constructed of 16mm diameter, steel reinforced nylon braided rope with a galvanized foundation steelwork.
Chains:	Shall be <u>4/0 straight link coil chain</u> .
Bell Assembly:	The Bell Assembly shall consist of a Bell, a Bell Support, a 7-link Chain, an eyebolt, and <u>Fastener Style A</u> hardware. The Bell shall be constructed of <u>A-60 Galvannealed</u> . The Bell Support shall be constructed of <u>1" Pipe</u> , <u>Gator Grip</u> . The Bell Chain shall be constructed of 1/4" diameter, 316 stainless steel chain. The eyebolt shall be 3/8" diameter zinc plated steel The Bell shall be assembled to <u>1" Pipe</u> , <u>Gator Grip</u> .
Step Castings:	Shall be cast alloyed aluminum.
Fasteners:	All hardware shall be <u>Fastener Style A</u> .
Finishes:	The Frame Assembly, Bell, and Wall Panels shall have a <u>Mira-Cote™</u> finish.

Consult Miracle's "Glossary of Technical Data for Materials, Processes and Finishes" for specifications of underlined items.

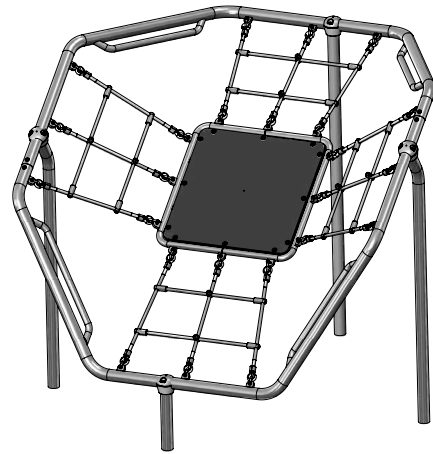
454-4



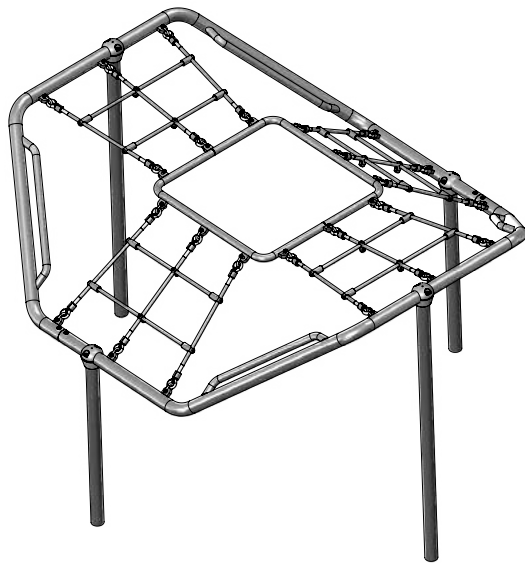
Hyperbolix™ Vertical, Angled, Horizontal High, Horizontal Low



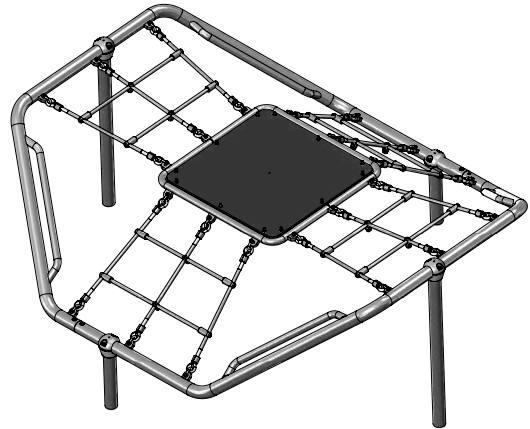
Model 4641 Hyperbolix™ Vertical



Model 4642 Hyperbolix™ Angled



Model 4643 Hyperbolix™
Horizontal High



Model 4644 Hyperbolix™
Horizontal Low

Hyperbolix™ Vertical, Angled, Horizontal High, Horizontal Low

<i>Model #</i>	<i>Product</i>	<i>Protective Area</i>	<i>Ground Space</i>	<i>Concrete</i>
4641	Hyperbolix™ Vertical	22' x 15'	10' x 3'	0.20 cu.yds.
4642	Hyperbolix™ Angled	19' x 19'	7' x 7'	0.20 cu.yds.
4643	Hyperbolix™ Horizontal High	20' x 19'	8' x 7'	0.20 cu.yds.
4644	Hyperbolix™ Horizontal Low	20' x 19'	8' x 7'	0.20 cu.yds.

4641, 4642, 4643, 4644

Hyperbolix™ Vertical, Angled, Horizontal High, Horizontal Low

DESCRIPTION

Hyperbolix™ is a challenging climber with sturdy ropes that allow children to practice balance while increasing upper and lower body strength. The climber is versatile in that it be used free-standing or link to a deck. It is also modular in that it can be used to create a large or small wave net like structure.

MATERIALS

Frame	Shall be constructed of 2-3/8" O.D. 12-gauge tubing and <u>1" pipe</u> . The rope blocks shall be made from mild steel. All solid <u>welded</u> .
Portal	Shall be constructed from 1" pipe. The rope blocks shall be made from mild steel. The support plate (when required) shall be constructed of 7-gauge sheet steel. All solid <u>welded</u> . The portal shall be filled in with <u>Flextread</u> (when required).
Support Legs	Shall be constructed of 2-3/8" O.D. 12-gauge tubing.
Rope Nets	Shall be constructed of 16mm diameter, steel reinforced nylon braided rope with a galvanized foundation steelwork.
Castings	Shall be constructed of cast alloyed aluminum.
Fasteners	Shall contain <u>Versalok Fasteners</u> and <u>Fastener Style A</u> hardware.
Finishes	All metal shall be finished in <u>Mira-Cote</u> .
Step (vertical model only)	Shall be constructed of <u>1" pipe</u> , <u>Gator Grip</u> . Step shall measure 14-1/2" in length and 6-7/8" in width.

SECTION 12 66 13

TELESCOPING BLEACHERS

PART 1 GENERAL

1.1 SPECIAL INSTRUCTIONS

- A. It is the intent of the following specification to establish a minimum acceptable quality standard for installed telescopic bleachers. The bidder shall be properly licensed, fully insured and bondable. Bidder must also have a minimum of five (5) DSA approved local installations of comparable size and with a successful history. The Owner reserves the right to award a contract based on quality. Price shall not necessarily be the sole criteria for award.

1.2 DESCRIPTION OF THE SYSTEM

- A. The bleacher system shall be comprised of multiple tiered, closed deck seating rows operating on the telescopic principle, and stacking vertically in minimal floor area when not in use.
- B. The first moving row shall be secured with both friction and mechanical locks. All other rows shall be mechanically locked, operable only upon unlocking and cycling the first row.
- C. Each bleacher row shall be comprised of risers, seat and deck components, and a complete set of supportive columns and braces.
- D. The operative system shall incorporate a locking system permitting the discretionary securement of one, several or all rows in the use or stacked position.

1.3 QUALITY ASSURANCE

- A. Products and materials to be provided are to be from manufacturers regularly engaged full-time in the manufacture or production of this and similar items, with a history of successful manufacture or production acceptable to the Owner. Additional documentation shall include:
- B. Evidence of prior approval by the Division of the State Architect of 5 projects of similar size and scope, complete with project name, description and Approval "A" number.
- C. A copy of a load test conducted by a qualified independent testing laboratory and certified by a registered professional structural engineer verifying the integrity of the manufacturer's geometry design and base structural assumptions.
- D. In addition to complying with pertinent codes and regulations, comply with industry and trade standards normally associated with this product or material, except where product or material is superior in quality to industry trade standards.
- E. Deviation: It will be the responsibility of the bidder to furnish with his bid a list and clarification of deviations from this specification. Those bidders not submitting a list of deviations will be deemed to have bid exactly in accordance with these specifications.
- F. Limited Guarantee: The manufacturer shall guarantee all work performed under these specifications to be free from defects for a period of five (5) years.
- G. Insurance Coverage: Bidder shall submit manufacturer's certification of insurance coverage for the life of the product.

- H. Product Improvements: Seating provided shall incorporate manufacturer's design improvements and materials current at time of shipment.

1.4 SUBMITTALS

- A. Submit data sufficient to demonstrate compliance with specifications and drawing requirements.
- B. Submit manufacturer's descriptive literature and installation instructions in accordance with Section 01 33 00.
- C. Submit operating and maintenance manuals in accordance with Section 01 70 00.
- D. Submit complete shop drawings and structural calculations (signed and stamped by the manufacturer's licensed professional engineer in charge of design).
- E. Submit samples of products and materials where options of color, finish, pattern or texture exist.

PART 2 PRODUCTS

2.1 DESIGN CRITERIA

- A. Telescopic bleacher design and fabrication shall comply with the 2022 Edition of the California Building Code, and shall be designed to support and resist in addition to their own weight, a force of:
 - 1. Seatboards and footboards shall be designed to resist a live load of 120 lbs. per linear foot.
 - 2. 100 lbs. per square foot of live load.
 - 3. Side sway load of 24 lbs. per linear foot.
 - 4. Front to rear sway load of 10 lbs. per linear foot of row.
- B. Railings, posts and sockets designed to withstand the following forces applied separately:
 - 1. 50 lbs. per foot acting outward at top rail.
 - 2. 25 lbs. per foot acting outward at mid-rail.
- C. Steel components shall be cold-formed from appropriate width strip stock.
- D. Lumber components as load carrying members shall be fabricated from Southern Pine boards graded and stamped as "B & BTR KD" and meeting the requirements for "Dense Industrial KD" in accordance with S.P.I.B. Grading Rules 1983 edition.
- E. Plywood deck boards shall be fabricated from Southern Pine or Douglas Fir Premium underlayment (interior C-D plugged and fully face sanded) with exterior glue, 5 ply minimum, solid crossband directly under face ply, species Group 1, dry condition of service (16% moisture content maximum), and manufactured in accordance with PS-1-83 for Construction and Industrial Plywood published by the National Bureau of Standards August 1, 1983.
- F. Provide accessible seating per the seating requirements CBC Section 11B-221.

2.2 SCOPE

- A. Telescopic seating as manufactured by Hussey Seating Company, North Berwick, Maine. Products of other manufacturer's may be considered equivalent provided they meet or exceed requirements of this specification. Substitutions shall be in accordance with Section 01 60 00. The

Architect and Owner shall be the sole judge of the equivalency of any proposed substitution. Substitutions shall be subject to approval of DSA.

- B. Model: *Maxam* model MAXAM 26 telescopic bleachers.
- C. Type: Wall Attached

2.3 OPERATION

- A. Integral Power: Furnish and install Hussey *PF4 Power Frame*, an integral automatic electro-mechanical propulsion system to open and close telescopic seating. Integral Power and Control System shall be Underwriters Laboratories, Inc. (UL) approved and listed.
- B. Operation shall be with a removable pendant control unit which plugs into seating bank for operator management of stop, start, forward, and reverse control of the power operation. Each Powered Frame unit shall consist of output shaft gear reducer with 6" diameter x 4" wide wheels covered with non-marring 1/2" thick composite rubber. Reducers shall be fitted with induction motors, which will provide an average operating speed of 46 f.p.m.
- C. Operating Loads: Each Powered Frame provides (220 / 550) lbs pull force which equals approximately (28 / 35) lbs psi lateral force on the floor.
- D. Electrical: Seating Manufacturer shall provide all wiring within seating bank including pendant control. Each unit is power operated by a 1/2 horsepower, 1725 R.P.M., 208 Volts, 50/60 Hz., three phase 1.25 service factor motor, with a full load current of 2.2 amperes. Power supply required shall be 120/208 volts three phase 4 wire plus ground service with 20 amps. Motors, housing, and wiring shall be installed and grounded in complete accord with the National
- E. Electric Code. The electrical contractor shall provide required power source with no greater than 4% voltage drop at the seating junction box. The electrical contractor shall perform all wiring connections in junction box that are attached to or a part of the building.
- F. Electrical service shall be run from the building power source in approved conduit in accordance with governing electrical codes. All work shall be performed by a licensed electrical contractor. Contractor shall furnish all conduit and wiring, plus 12" x 12" x 4" junction boxes and manual disconnects (Square "D" model DU 322 or equivalent). The electrical contractor shall perform the connections to the seating equipment at the junction box and control station. Motors, housing, and wiring shall be installed and grounded in complete accord with the National Electric Code.

2.4 ACCESSORIES

- A. Modular First Row: *Flex-Row* seating is not allowed. Wheelchair seating shall be permanently fixed in the deployed position without the need for additional configuration once the bleachers are opened for use. Each ADA wheelchair space shall be provided with an adjacent bleacher companion seat. The use of loose seating which must be stored elsewhere is not acceptable.
- B. Foot Level Aisles: Provide deck level full width vertical aisles located as indicated or in accordance with code requirements. Aisles shall be equipped with intermediate steps and handrails. Intermediate steps shall be boxed fully enclosed type construction with blow molded end caps with full radius on all four edges. Step shall have non-skid on surface. Aisle handrails shall be single pedestal mount, 34" high with terminating mid rail. Handrails shall be attached to the socket and shall fold for self-storage on the aisle step. Aisle handrails that must be detached from the socket for storage are unacceptable. Provide at the front edge of each aisle step, an adhesive-backed abrasive non-slip tread surface.

- C. End Rails: Provide steel self-storing and removable (where applicable) 42" high above seat, end rail with tubular supports and intermediate members designed with 4" sphere passage requirements.
- D. Cross-Aisle Front Rail: Provide 26" high above deck, steel rails with tubular supports and intermediate members. Rail to be located at the front of the cross-aisle behind the last seating row.
- E. Safety End Closures: Provide at each exposed bleacher end, a self-storing end safety closure curtain to close off the underside of the bleachers. The curtain shall be designed to open and close with the bleachers, and shall be constructed of heavy 14 oz. vinyl, cut and welded to the precise contour of the bleachers. Curtain shall be attached to the rear wall and the first row of the bleacher, and shall be designed so as to maintain 3" clearance above the floor. The curtain shall be attached to each bleacher row by means of an offset bracket and support chain which attaches through heavy duty brass grommets in the closure. The bottom of the curtain shall have a Link-Machine Chain in a welded pocket to prevent the closure from being lifted when in the open position. The curtain shall be available in 12 standard colors, and each closure shall include safety warnings.

2.5 MATERIALS

- A. Lumber: ANSI/Voluntary Product 20, B & B Southern Pine
- B. Plywood: ANSI/Voluntary Product PS1, APA A-C Exterior Grade.
- C. Structural Steel Shapes, Plates and Bars: ASTM A 36.
- D. Uncoated Steel Strip (Non-Structural Components): ASTM A569, Commercial Quality, Hot-Rolled Strip.
- E. Uncoated Steel Strip (Structural Components): ASTM A570 Grade 33, 40, 45, or 50, Structural Quality, Hot-Rolled Strip.
- F. Uncoated Steel Strip (Structural Components): ASTM A607 Grade 45 or 50, High-Strength, Low Alloy, Hot-Rolled Strip.
- G. Galvanized Steel Strip: ASTM A653 Grade 40, zinc coated by the hot-dip process, structural quality.
- H. Structural Tubing: ASTM A500 Grade B, cold-formed.
- I. Polyethylene Plastic: ASTM D 1248, Type III, Class B; molded, color-pigmented, textured, impact-resistant, structural formulation; in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- J. Fasteners: Vibration-proof, of size and material standard with manufacturer.

2.6 FABRICATION

- A. Wheels: Not less than 5" diameter by 1-1/4" with non-marring soft rubber face to protect wood and synthetic floor surfaces, with molded-in sintered iron oil impregnated bushings to fit 3/8" diameter axles secured with E-type snap rings.
- B. Lower Track: Continuous Positive Interglide (CPI) system interlocks each adjacent CPI unit using an integral, continuous, anti-drift feature and through-bolted guide at front to prevent separation and misalignment. Each CPI unit shall contain a Low Profile *Posi-Lock LX* to lock each row in

open position and allow unlocking automatically. Provide adjustable stops to allow field adjustment of row spacing.

- C. Slant Columns: High tensile steel, tubular shape.
- D. Sway Bracing: High tensile steel members through-bolted to columns.
- E. Upper Guide: High tensile steel through-bolted to nose and riser. Interlocks with adjacent upper tier to prevent separation and misalignment. Provide adjustable stops to allow field adjustment of row spacing.
- F. Deck System: Each bank shall contain sections not to exceed 25'-6" in length with a minimum of two supporting frames per row, each section. Nose beam shall be continuously roll-formed closed tubular shape of ASTM A653 grade 40, Riser beam shall be continuously roll-formed of ASTM A653 grade 40. Nose and Riser beam shall be designed with no steel edges exposed to spectator after product assembly. Nose and rear riser beams shall be through-bolted fore/aft to deck guides, and frame cantilevers
- G. Deck Stabilizers: High tensile steel member through-bolted to nose and riser at three locations per section. Interlocks with adjacent stabilizer on upper tier using low-friction nylon roller to prevent separation and misalignment. Stabilizer shall incorporate multiple stops to allow field adjustment of row spacing.
- H. Deck Support: Securely captures decking for entire length of section.
- I. Decking: 5/8", AC grade, tongue & groove, transversely oriented plywood, interior type with exterior glue, 5-ply, all plies Southern Pine with plugged crossbands, produced in accordance with National Bureau of Standards PS-1-83. Longest unsupported span: 21 1/2".
- J. Deck End Overhang: Not to exceed frame support by more than 5'-7".
- K. Seats: Shall be *Courtside XC10 Plastic* Seat System. Polyethylene Plastic shall be ASTM D 1248, Type III, Class B; molded, color-pigmented, textured, impact-resistant, structural formulation. Seats shall consist of 18" long unitized, interlocking, engineered, 100% recyclable HDPE (high density) polyethylene modules providing scuff resistant dual textured 10" wide anatomically comfort contoured seat surface. Unit shall be tested to 600 lbs occupant load. Seat module shall be of one-piece construction with 1/2" minimum interlock on seat and face. Seat shall be designed with internal reinforcement and shall be cantilevered to the rear with an integral rear closure panel, to allow for a "continuous clean sweep" of debris at deck level. Row ends shall be equipped with integrally-molded end caps for a clean finished appearance. Each seat module shall be securely anchored by means of a 12 gauge steel clamp bracket providing steel-to-steel through bolted attachment to the front nose beam of the bleacher eliminating fore/aft movement of the seat module. Seat module shall be designed with recess pockets to accept (optional) seat number and row letter plates. Each row end shall have an integrally molded recess to accept (optional) graphic logo inserts. Seats shall be available with *Signature Logo* lettering in up to two (2) additional colors.

2.7 SHOP FINISHES

- A. Understructure: For rust resistance, steel understructure shall be finished on all surfaces with black "Dura-Coat" enamel. Understructure finish shall contain a silicone additive to improve scratch resistance of finish.
- B. Wear Surfaces: Surface subject to normal wear by spectators shall have a finish that does not wear to show different color underneath.

- C. Steel nosing and rear risers shall be pre-galvanized with a minimum spangle of G-60 zinc plating.
- D. Decking shall have surfaces to receive a sealer coat with use surfaces to receive high gloss clear urethane finish.
- E. Plastic Seats: Injection-molded seat module color(s) to be selected from manufacturer's (15) fifteen standard colors in solid and/or two-tone color combinations.
- F. Railings: Steel railings shall be finished with powder-coated semi-gloss finish as selected from manufacturer's fifteen (15) standard available colors.
- G. Safety Finishes: All exposed metal and wood structure both on top surfaces and beneath bleachers shall be eased, coined or chamfered to minimize the possibility of injury, and all areas which are "off-limits" to all but authorized personnel shall be so labeled. Products with exposed die-cut or stamped metal edges or with exposed sharp corners are not acceptable. Flex-Row modules shall be furnished with Black full-surround steel skirting with no more than 3/4" floor clearance for safety and improved aesthetics, and the nose beam shall be fitted with a Black injection molded end cap for safety and improved aesthetics.

2.8 FASTENINGS:

- A. Welds: Performed by welders certified by AWS standards for the process employed.
- B. Structural Connections: Secured by structural bolts with prevailing torque lock nuts or free-spinning nuts in combination with lock washers.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verification of Conditions: Verify area to receive telescoping bleachers is free of impediments interfering with installation and condition of installed substrates is acceptable to receive telescoping seating in accordance with manufacturer's recommendations.
- B. Do not commence installation until conditions are satisfactory.

3.2 INSTALLATION

- A. Manufacturer's Recommendations: Comply with telescoping bleacher manufacturer's recommendations for product installation requirements.
- B. General: Install telescoping bleachers in accordance with manufacturer's installation instructions and final shop drawings. Provide accessories, anchors, fasteners, inserts and other items for installation of telescoping gym seats and for permanent attachment to adjoining construction.

3.3 ADJUSTMENTS AND CLEANING

- A. Adjustments: After installation completion, test and adjust each telescoping bleacher assembly to operate in compliance with manufacturer's operations manual.
- B. Cleaning: Clean installed telescoping seating on both exposed and semi-exposed surfaces. Touch-up finishes to restore damaged or soiled surfaces.
- C. Remove all debris from work site.

3.4 PROTECTION

- A. General: Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer to ensure telescoping gym seats are without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 21 13 00

FIRE SUPPRESSION SPRINKLER SYSTEMS

PART 1 GENERAL

1.1 REFERENCES

- A. AMERICAN IRON AND STEEL INSTITUTE (AISI)
 - 1. AISC/AISI 121 (2007) Standard Definitions for Use in the Design of Steel Structures
- B. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
 - 1. ASME A112.18.1 (2018) Plumbing Supply Fittings
 - 2. ASME B1.20.1 (2013) Pipe Threads, General Purpose (Inch)
 - 3. ASME/ANSI B16.1 (2020) Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250
 - 4. ASME/ANSI B16.3 (2016) Malleable Iron Threaded Fittings, Classes 150 and 300
 - 5. ASME/ANSI B16.4 (2016) Standard for Gray Iron Threaded Fittings; Classes 125 and 250
- C. AMERICAN WATER WORKS ASSOCIATION (AWWA)
 - 1. AWWA C111/A21.11 (2017) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - 2. AWWA C151/A21.51 (2017) Ductile-Iron Pipe, Centrifugally Cast
 - 3. AWWA C900 (2016) Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4-inch Through 60-inch
- D. ASTM INTERNATIONAL (ASTM)
 - 1. ASTM A47/A47M (1999) Standard Specification for Ferritic Malleable Iron Castings
 - 2. ASTM A53/A53M (2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - 3. ASTM A135/A135M (2009; R2014) Standard Specification for Electric-Resistance-Welded Steel Pipe
 - 4. ASTM A234/A234M (2019) Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
 - 5. ASTM A536 (1984) Standard Specification for Ductile Iron Castings
 - 6. ASTM D1784 (2020) Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
- E. FM GLOBAL (FM)
 - 1. FM APP GUIDE (updated on-line) Approval Guide <http://www.approvalguide.com/>
- F. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
 - 1. NFPA 13 (2022) Standard for the Installation of Sprinkler Systems
 - 2. NFPA 24 (2019) Standard for the Installation of Private Fire Service Mains and Their Appurtenances
- G. UNDERWRITERS LABORATORIES (UL)

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Conduct a survey of the work area. Commencement of work constitutes acceptance of existing conditions.
- B. Convene one week before starting work of this section for preinstallation meeting.

1.3 SUBMITTALS

- A. Submit the following in accordance with DIVISION 01 – GENERAL REQUIREMENTS.
1. Shop Drawings
 - a. Shop drawings prepared in accordance with NFPA 13, including hydraulic calculations that are approved by the Authority Having Jurisdiction. Drawings shall have the approval of a NICET Level III (or higher) registered in the state in which the project is located. Drawings to consist of the following, refer to NFPA 13 “Plans and Calculations” for a comprehensive list of items to be included:
 - 1) Piping plan view and/or Reflected Ceiling Plan (RCP) drawing(s) indicating relationship of all other trades and approved sprinkler head locations.
 - 2) Details and sections to clearly identify design intent.
 - 3) Plans shall include: Seismic zones of influence, hydraulic remote areas, elevations of pipe, attachment locations and type, zones and associated coverage areas, volume of dry system(s) (if applicable), locations of seismic separation and expansion joints, hose cabinet locations, drain locations, primary fire pumps, secondary pumps, supply, pressure maintenance pumps, controllers, drivers and accessories.
 2. Product Data
 - a. Provide data on piping, valves, sprinklers, hangers/supports, hose cabinets, notification devices, specialties and accessories. Product data shall include manufacturers catalog information with performance ratings, rough-in details, finish, weights, and installation requirements.
 - 1) Each product shall be referred to on submittals, drawings, and other documentation, by the identification or model number as specifically published in the appropriate agency listing or approval.
 3. Design Data
 - a. Provide detailed hydraulic calculations that clearly demonstrate that the water supply will meet the demand of the sprinkler system and hose streams. Calculations shall accompany design drawings and shall be based on a water flow test conducted at the site within six (6) months of the submittal of plans for approval. Flow test information and associated nodes shall be documented on shop drawings and include a site plan.
 - b. Provide complete seismic calculations that clearly reflect seismic restraint with supporting site specific force factor and attachment details used, relative to an associated zone of influence.
 4. Test Reports
 - a. Contractor’s Material & Test Certificate Reports in accordance with NFPA for above ground piping, underground piping, pressure, system operation, air, valve and drain tests.

1.4 QUALITY ASSURANCE

- A. Fire protection system materials and components shall be Underwriter’s Laboratories listed and labeled, or Factory Mutual approved.

- B. Company specializing in performing the work of this section shall have a minimum of five years experience and approved by manufacturer.
- C. Manufacturing Company shall be one specializing in manufacturing the products specified with a minimum three years documented experience.

1.5 COORDINATION

- A. The Contractor shall coordinate and reflect routing and location of equipment, devices, and materials with other disciplines, where not already indicated, on the design documents. Indicate required space for routine maintenance and inspection, including location and sizes of access doors.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. All fire protection system materials and equipment shall be Underwriters Laboratories (UL) listed or the Factory Mutual (FM) approved for its intended use.

2.2 EQUIPMENT

- A. Underground Piping Materials – Pipe must comply with NFPA 24. Minimum pipe size is 4 inches. A continuous section of welded stainless steel fire water service piping from a point outside the building perimeter to a flanged fitting at least 6-inches above the finished floor within the building.
- B. Underground Piping Materials - Provide fittings of the same type and class of material as the pipe or have equal or superior physical and chemical properties.
 - 1. Ductile Iron
 - a. Provide mechanical-joint or push-on type ductile-iron water pipe, centrifugally cast, UL listed and labeled, conforming to applicable provisions of AWWA C111/A21.11, and AWWA C151/A21.51. Wall-thickness criteria is 200-pounds per square inch (psi) working pressure plus 100-psi surge allowance.
 - 2. PVC
 - a. AWWA C900 plain end or gasket bell end pipe meeting or exceeding ASTM D1784 cell class 12454, with a minimum Pressure Class 200 (DR21) with ductile iron outside diameter (DIOD).
- B. Aboveground Piping Materials
 - 1. BCS - Black Carbon Steel
 - a. All piping 2-inch and smaller: Schedule 40, black-carbon steel conforming to ASTM A53, or ASTM A135, threaded or roll grooved ends. All 1-inch pipe shall have threaded ends.
 - b. All Piping 2-1/2-inch through 8 inch: Schedule 10, black carbon steel conforming to ASTM A53 or ASTM A135, roll grooved ends.
 - 2. GCS - Galvanized Carbon Steel
 - a. All piping 1/2- inch through 8-inch: Schedule 40 seamless or electric resistant welded galvanized steel conforming to ASTM A53/A53M, Type E (electric-resistance welded) or Type S (seamless). Type F (furnace butt welded continuous welded) is acceptable for sizes less than 2 inches.

- C. Backflow Preventers
1. UL listed and FM approved “lead free” double detector check type, or reduce pressure backflow (contingent on municipality requirements). Provide with stainless steel working parts, spring loaded check valves, bronze body ball test cocks, and cast-iron or stainless-steel body. Assembly shall include an auxiliary leak detection line with ¾” type “L” coper tube and fittings, bronze body ball shutoff valves, 5/8” x ¾” disc type water meter, bronze body double check valve backflow preventer with test cocks.
- D. Fittings and Couplings
1. Cast-Iron Threaded Fittings:
 - a. ASME/ANSI B16.4, Class 125, standard pattern, for threaded joints. Threads shall conform to ANSI B1.20.1.
 2. Malleable-Iron Threaded Fittings:
 - a. ASME/ANSI B16.3, Class 150, standard pattern, for threaded joints. Threads shall conform to ANSI B1.2.1.
 3. Steel Fittings:
 - a. ASTM A234/A234M, seamless or welded, for welded joints.
 4. Grooved Mechanical Fittings:
 - a. ASTM A536, Grade 65-45-12 ductile iron; ASTM A47 Grade 32510 malleable iron; or ASTM A53, Type F or Types E or S, Grade B fabricated steel fittings with grooves or shoulders designed to accept grooved end couplings.
 5. Grooved Mechanical Couplings:
 - a. consist of ductile or malleable iron housing, a synthetic rubber gasket of a central cavity pressure-responsive deign; with nuts, bolts, locking in, locking toggle, or lugs to secure roll-grooved pipe and fittings. Grooved mechanical couplings including gaskets used on dry-pipe systems shall be listed for dry-pipe service.
 6. Cast-Iron Flanges:
 - a. ASME/ANSI B16.1, Class 125, raised ground face, bolt holes spot faced.
 7. Unions:
 - a. Malleable iron, Class 150 hexagonal stock, with ball-and-socket joints, metal-to-metal bronze seating surfaces, female threaded ends. Threads shall conform to ASME B1.20.1.
 8. Dielectric Unions:
 - a. Threaded, solder, or grooved-end connections as required to suit application’ constructed to isolate dissimilar metals, prevent galvanic action, and prevent corrosion.
- E. Pipe Hangers and Supports
1. Shall be UL listed and shall meet requirements of NFPA 13 for type, dimension and location.
 2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 3. Hangers for Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis.
 4. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
 5. Wall Support for Pipe Sizes 4 inches and Over: Welded steel bracket and wrought steel clamp.
 6. Vertical Support: Steel riser clamp.

7. Hanger Rods: Use only circular solid cross section rod hangers to connect building structure attachments to pipe-support devices. Use pipe, straps, or bars of equivalent strength for hangers.
- F. Fire Department Connections
1. Provide freestanding type with cast-brass body. The connection must have individual self-closing clappers, caps with drip drains and chains. Female inlets must have 2 1/2-inch diameter American National Fire Hose Connection Screw Threads (NH) per NFPA 1963. Comply with UL 405.
- G. Alarm Devices
1. General: Types and sizes shall mate and match piping and equipment connections.
 2. Water Flow Indicators (Wet-pipe Systems): vane type waterflow detector, rated to 250 psi; designed for horizontal or vertical installation; have 2-SPDT circuit switches to provide isolated alarm and auxiliary contacts, 7 ampere 125 volts AC and 0.25 ampere 24 Volts DC; completed with factory-set, field-adjustable retard element to prevent false signals, and tamperproof cover.
 3. Electric Alarm Bell: UL listed 10" electric operated factory painted alarm bell with weatherproof bell kit and bell guard. Bell shall have minimum 90 decibel rating. Provided engraved plate under Bell lettered "Sprinkler System."
 4. Supervisory Switches: SPST, normally closed contacts, designed to signal valve in other than full open position and tamperproof cover.

2.3 Automatic Sprinklers

- A. Sprinklers must comply with UL 199 and NFPA 13. Sprinklers with internal O-rings are not acceptable. Sprinklers in high heat areas including attic spaces or in close proximity to unit heaters must have temperature classification in accordance with NFPA 13. Extended coverage sprinklers are permitted for loading docks, residential occupancies and high-piled storage applications only.
1. Sprinkler Finishes: Provide sprinklers and matching escutcheons as indicated in the contract documents or as approved by Owner or Architect. All sprinklers are to be glass bulb type unless otherwise approved by Owner or Architect.
 2. Pendent Sprinkler
 - a. Pendent sprinkler must be recessed quick response type with nominal K-factor of 5.6. Pendent sprinklers must have an architect approved finish. Assembly must include an integral and matching escutcheon.
 3. Upright Sprinkler
 - a. Upright sprinkler must be quick-response type with architect approved finish and have a nominal K-factor of 5.6.
 4. Concealed Sprinkler
 - a. Concealed sprinkler must be quick response type and have a nominal K-factor of 5.6. Cover plate must be architect approved.
- B. Sprinkler Cabinet and Wrench: Provide spare sprinklers in accordance with NFPA 13 and must be placed in a suitable metal or plastic cabinet of sufficient size to accommodate all the spare sprinklers and wrenches in designated locations. Spare sprinklers must be representative of, and in proportion to, the number of each type and temperature rating of the sprinklers installed as required by NFPA 13. At least one wrench of each type required must be provided.
- C. Head Protection
1. Protect heads with paper or plastic bags during painting operations. Remove protection immediately upon finishing painting operations.

2. Provide head guards wherever mechanical damage could occur. Guard finish to be red enamel.
- D. Aboveground Valves
1. Ensure gate, globe, and check valves (all sizes) are FM approved or UL listed.
 2. Ensure ball valves, 2 inches and under, are FM approved, rated 300 psi, with provisions to wire or lock handle in place where critical alarm function may be isolated.
 3. Ensure butterfly valves, 6-inches and larger are FM approved, rated 175 psi, cast-iron bodied wafer type, with elastomer liners and seals.
- E. Paints and Coatings
1. Paints and coatings must comply with:
 - a. The California Department of Public Health (CDPH) Standard Method v1.1-2010 general testing and emissions evaluation requirements.
 - b. All paints/coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (2007), Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.
- F. Adhesives, Sealants, and Sealant Primers
1. Adhesives, sealants, and sealant primers must comply with:
 - a. The California Department of Public Health (CDPH) Standard Method v1.1-2010 general testing and emissions evaluation requirements.
 - b. All adhesives, sealants, and sealant primers wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by methods specified in Rule 1168.

PART 3 EXECUTION

3.1 Preparation

A. Painting

1. If manufacturer's standard-finish equipment surfaces are damaged during construction, bring to as-new condition by touchup or repainting to the satisfaction of the Contracting Officer, or replaced with new undamaged equipment at no additional cost to the Owner.

3.2 Installation

- A. Ensure installation of system materials and equipment is in accordance with the recommendations and provisions of NFPA 13 and NFPA 24. Perform work in the presence of the Contracting Officer.
- B. Perform all installation work by licensed fire protection sprinkler contractors, licensed for such work in the state where the work is to be performed.

3.3 Underground Piping Installation

- A. The fire protection water main shall be laid, and joints anchored, in accordance with NFPA 24. Minimum depth of cover shall be 3-feet. The supply line shall terminate inside the building with a flanged piece, the bottom of which shall be set not less than 6-inches above the finished floor. A

blind flange shall be installed temporarily on top of the flanged piece to prevent the entrance of foreign matter into the supply line.

B. Thrust Blocks

1. Construct thrust blocks with compressive strength of 4,000 psi at 28 days to absorb hydraulic thrust at caps, plugs, and at system change-of-direction fittings. Place concrete against undisturbed soil, with an area sufficient to provide load transmittal.

3.4 Aboveground Piping Installation

- A. Locations and Arrangements: Coordinate installation of horizontal piping with other components. Allow sufficient space above removable ceiling panels to allow for panel removal.
- B. Install system such that all piping is rigidly secured and supported. Cutting of structural members for passage of sprinkler pipes or hangers will not be permitted. Route all sprinkler piping and provide all offsets, bends and elbows around all mechanical, electrical, and structural members as required. In areas with ceilings, piping shall be routed concealed, above ceiling. In areas without ceilings, piping shall extend as high as possible.
- C. Deviations from approved "Working Plans" for sprinkler piping require written approval of the Authority Having Jurisdiction. Written approval shall be on file with the Engineer prior to deviating from the approved "Working Plans."
- D. Install sprinkler piping to provide for system drainage in accordance with NFPA 13.
- E. Use approved fittings to make all changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- F. Hangers and Supports: Comply with the requirements of NFPA 13. Hanger support spacing and locations for piping joined with grooved mechanical couples shall be in accordance with the grooved mechanical coupling manufacturer's written instructions, for rigid systems. Provide protection from damage where subject to earthquake if required by the applicable building code, designed in accordance with NFPA 13.
- G. Make connections between underground and aboveground piping using an approved transition piece strapped or fastened to prevent separation.
- H. Install mechanical sleeve seal at pipe penetrations in basement and foundation walls.
- I. Install test connections sized and located in accordance with NFPA 13 complete with shutoff valve. Test connections may also serve as drain pipes.
- J. Install pressure gauge on the riser or feed main at or near each test connection. Provide gauge with a connection not less than ¼ inch and having a soft metal seated globe valve arranged for draining pipe between gauge and valve. Install gauges to permit removal, and where they will not be subject to freezing.
- K. Install automatic air vent at high point of system(s) in accordance with NFPA 13.
- L. Sleeves
 1. Provide sleeves where piping passes through roofs, masonry or concrete walls, or floors.
 2. Continuously weld or braze sleeves to the deck when passing through steel decks.
 3. Install sleeves that are continuous when extending through floors, roofs, or load-bearing walls, and sleeves through fire barriers. Fabricate sleeves from Schedule 40 steel pipe with welded anchor lugs. Form other sleeves by molded linear polyethylene liners or similar

materials that are removable. Ensure diameter of sleeves is large enough to accommodate pipe, insulation, and jacketing without touching the sleeve, and additionally provides a minimum 3/8-inch clearance. Install sleeve to accommodate mechanical and thermal motion of pipe and to preclude transmission of vibration to walls and generation of noise.

4. Pack solid the space between a pipe and the inside of a pipe sleeve or a construction surface penetration or wherever the piping passes through firewalls, equipment-room walls, floors, and ceilings connected to occupied spaces, and other locations where sleeves or construction-surface penetrations occur between occupied spaces. Use a mineral fiber. Where sleeves or construction-surface penetrations occur between conditioned and unconditioned spaces, fill the space between a pipe, bare or insulated, and the inside of a pipe sleeve or construction-surface penetration with an elastomer caulk to a depth of 1/2 inch. Ensure surfaces are oil- and grease-free before caulking.
5. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.

M. Escutcheons

1. Install escutcheons at penetrations of piping into finished areas. Where finished areas are separated by partitions through which piping passes, provide escutcheons on both sides of the partition. Where suspended ceilings are installed, attach plates at the underside only of such ceilings. Use chrome plated escutcheons in occupied spaces and conceal openings in building construction. Ensure escutcheons are firmly attached.

3.5 Field Quality Control

A. System Testing

1. Prior to acceptance of the work, test completed systems in the presence of the Contracting Officer. Upon approval, provide certificates of testing.
2. Conduct a hydrostatic test, unless otherwise specified. Use only potable water for testing.
3. Perform full-flow system operating tests for standpipe systems.
4. Prepare and maintain test records of piping-system tests. Ensure records show personnel responsibilities, dates, test-gage identification numbers, ambient and test-water temperatures, pressure ranges, rates of pressure drops, and leakage rates. Each test acceptance requires the signature of the Contracting Officer.

B. Test Gauges

1. Acceptable test gauges have 4-1/2-inch dials or larger with accuracy of plus or minus 1/2 of 1 percent of full-scale range and dial graduations and pointer width compatible with readability to within one-half of the accuracy extremes.

C. Pneumatic Testing

1. Perform pneumatic Pressure Tests when freezing conditions may occur and upon prior approval by the Contracting Officer. Use oil-free compressed air used for testing.

D. Test and Acceptable Criteria

1. Perform above ground systems pressure tests at 200 psi and maintain the applied pressure without further addition of test media for not less than 2 hours. No pressure drop is allowed.
2. Test underground rubber-jointed ferrous-pipe water systems at 200 psi, and maintain the applied test pressure for not less than 2 hours. Maximum allowable pressure drop is 2 psi. After satisfactory hydrostatic testing, test piping for leakage as follows:
 - a. Duration of each leakage test is not less than 2 hours; during the test, subject the main to 200 psi pressure based on the elevation of the lowest section under test and corrected to the elevation of the test gage.

- b. Leakage is defined as the quantity of water supplied into the laid pipe, or any valved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.
 - c. Amount of leakage at the joints cannot exceed 2 quarts per 100 joints regardless of pipe diameter.
 - d. Apply hydrostatic tests to piping with concrete thrust blocking only after the concrete has cured for more than 7 calendar days.
3. Test backflow prevention into connected potable-water systems and system devices for proper functioning under conditions normal to their application. Repair dripping or weeping joints.

3.6 Adjusting and Cleaning

- A. At the completion of the work, clean all parts of the installation. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system. Adjust automatic control devices for proper operation.

3.7 Protection

- A. Flushing
 - 1. Before overhead sprinkler piping can be connected to the underground piping, verification of an approved hydrostatic test and flush must be furnished.

END OF SECTION

SECTION 21 13 13

WET PIPE SPRINKLER SYSTEMS FIRE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

- A. AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)
 - 1. ASSE 1013 (2011) Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers
 - 2. ASSE 1015 (2011) Performance Requirements for Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies

- B. AMERICAN WATER WORKS ASSOCIATION (AWWA)
 - 1. AWWA C104/A21.4 (2016) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
 - 2. AWWA C203 (2008) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
 - 3. AWWA M14 (2015) Manual: Recommended Practice for Backflow Prevention and Cross-Connection Control

- C. ASTM INTERNATIONAL (ASTM)
 - 1. ASTM A47/A47M (1999) Standard Specification for Ferritic Malleable Iron Castings
 - 2. ASTM A53/A53M (2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - 3. ASTM A183 (2014; R 2020) Standard Specification for Carbon Steel Track Bolts and Nuts
 - 4. ASTM A536 (1984) Standard Specification for Ductile Iron Castings

- D. FM GLOBAL (FM)
 - 1. FM APP GUIDE (updated on-line) Approval Guide <http://www.approvalguide.com/>
 - 2. FM 1637 (2010) Flexible Sprinkler Hose with Threaded End Fittings

- E. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
 - 1. NFPA 13 (2022) Standard for the Installation of Sprinkler Systems
 - 2. NFPA 24 (2019) Standard for the Installation of Private Fire Service Mains and Their Appurtenances

- F. UNDERWRITERS LABORATORIES (UL)

1.2 SYSTEM DESCRIPTION

- A. Hydraulic Design
 - 1. Hydraulic Calculations
 - a. Water supply curves and system requirements must be plotted on semi-logarithmic graph.
 - b. Provide a summary sheet listing sprinklers in the design area and their respective hydraulic reference points, elevations, minimum discharge pressures and minimum flows. Elevations of hydraulic reference points (nodes) must be indicated.
 - c. Documentation must identify each pipe individually and the nodes connected thereto. Indicate the diameter, length, flow, velocity, friction loss, number and

type fittings, total friction loss in the pipe, equivalent pipe length and Hazen-Williams coefficient for each pipe.

- d. Where the sprinkler system is supplied by interconnected risers, the sprinkler system must be hydraulically calculated using the hydraulically most demanding single riser. The calculations must not assume the simultaneous use of more than one riser.
- e. All calculations must include the backflow preventer manufacturer's stated friction loss at the design flow.
- f. All calculations must be performed back to the actual location of the flow test, taking into account the direction of flow in the service main at the test location.
- g. For gridded systems, calculations must show peaking of demand area friction loss to verify that the hydraulically most demanding area is being used. A flow diagram indicating the quantity and direction of flows must be included.

2. Design Criteria

- a. Hydraulically design the system to discharge a minimum density as indicated on the drawings or must be in accordance with the Area/Density Method of NFPA 13. Add an allowance for exterior and interior hose streams as required by NFPA 13.

B. Sprinkler Coverage

- 1. Sprinklers must be uniformly spaced on branch lines. Provide coverage throughout 100 percent of the area noted on the Contract drawings. This includes, but is not limited to, telephone rooms, electrical equipment rooms (regardless of the fire resistance rating of the enclosure), boiler rooms, switchgear rooms, transformer rooms, attached electrical vaults and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13. Provide sprinklers below all obstructions in accordance with NFPA 13.

C. Qualified Fire Protection Engineer (QFPE)

- 1. An individual who is a licensed professional engineer (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and has relevant fire protection engineering experience.

1.3 SUBMITTALS

- A. Shop drawings, product data and calculations must be prepared by the designer and combined and submitted as one complete package. The QFPE must review the submittal package for completeness and compliance with the Contract provisions prior to submission.

B. Submit the following:

- 1. Shop Drawings
- 2. Product Data
 - a. Pipe
 - b. Fittings
 - c. Valves, including gate, check, butterfly, and globe
 - d. Alarm Valves
 - e. Relief Valves

- f. Sprinklers
- g. Pipe hangers and Supports
- h. Sprinkler alarm switch
- i. Valve supervisory (tamper) switch
- j. Fire department connection
- k. Backflow prevention assembly
- l. Air vent
- m. Hose valve
- n. Seismic bracing
- o. Nameplates
- 3. Design Data
 - a. Seismic bracing
 - b. Load calculations for sizing of seismic bracing
 - c. Hydraulic calculations
- 4. Test Reports
 - a. Test procedures
- 5. Certificates
 - a. Verification of Compliant Installation
- 6. Operation and Maintenance Data
 - a. Operating and Maintenance (O&M) Instructions
 - b. Spare Parts Data
- 7. Closeout Submittals
 - a. As-built drawings

1.4 QUALITY ASSURANCE

- A. Preconstruction Submittals - Within 36 days of contract award but no less than 14 days prior to commencing work on site, the prime Contractor must submit drawings, calculations and product data for review and approval.
 - 1. Shop Drawing -copies of the shop drawings, no later than 28 days prior to the start of system installation. Working drawings conforming to the requirements prescribed in NFPA 13. Each set of drawings must include the following:
 - a. A descriptive index with drawings listed in sequence by number. A legend sheet identifying device symbols, nomenclature, and conventions used in the package.
 - b. Floor plans drawn to a scale not less than 1/8-inch equals 1-foot clearly showing locations of devices, equipment, risers, and other details required to clearly describe the proposed arrangement.
 - c. Actual center-to-center dimensions between sprinklers on branch lines and between branch lines; from end sprinklers to adjacent walls; from walls to branch lines; from sprinkler feed mains, cross mains and branch lines to finished floor and roof or ceiling.

- d. Longitudinal and transverse building sections showing typical branch line and cross main pipe routing, elevation of each typical sprinkler above finished floor and elevation of "cloud" or false ceilings in relation to the building ceilings.
 - e. Plan and elevation views which establish that the equipment will fit the allotted spaces with clearance for installation and maintenance.
 - f. Riser layout drawings drawn to a scale of not less than 1/2-inch equals 1-foot to show details of each system component, clearances between each other and from other equipment and construction in the room.
 - g. Details of each type of riser assembly, pipe hanger, sway bracing for earthquake protection, and restraint of underground water main at point-of-entry into the building, and electrical devices and interconnecting wiring. The dimension from the edge of vertical piping to the nearest adjacent wall(s) must be indicated on the drawings when vertical piping is located in stairs or other portions of the means of egress.
 - h. Details of each type of pipe hanger, seismic bracing/restraint and related components.
 - i. Include fire pump curve with shop drawings and hydraulic calculations.
2. Product Data
- a. Annotated catalog data to show the specific model, type, and size of each item. The data must be highlighted to show model, size, options, and other pertinent information, that are intended for consideration. Data must be adequate to demonstrate compliance with all contract requirements. Product data for all equipment must be combined into a single submittal.
3. Hydraulic Calculations
- a. Calculations must be as outlined in NFPA 13 except that calculations must be performed by computer using software intended specifically for fire protection system design using the design data shown on the drawings.
4. Operating and Maintenance Instructions
- a. Provide 3 hard copy manuals and one pdf version on electronic media. The manuals must include the manufacturer's name, model number, parts list, list of parts and tools that should be kept in stock by the owner for routine maintenance, troubleshooting guide, and recommended service organization (including address and telephone number) for each item of equipment.

B. Qualifications

- 1. Sprinkler System Designer
 - a. The sprinkler system designer must be certified as a Level III Technician by National Institute for Certification in Engineering Technologies (NICET) in the Water-Based Systems Layout subfield of Fire Protection Engineering Technology.
- 2. Sprinkler System Installer
 - a. The sprinkler system installer must be regularly engaged in the installation of the type and complexity of system specified in the contract documents, and must have served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 6 months.

C. Regulatory Requirements

1. Equipment and material must be listed or approved. Listed or approved, as used in this Section, means listed, labeled or approved by a Nationally Recognized Testing Laboratory (NRTL) such as UL Fire Prot Dir or FM APP GUIDE. The omission of these terms under the description of an item or equipment described must not be construed as waiving this requirement. All listings or approvals by testing laboratories must be from an existing ANSI or UL published standard. The recommended practices stated in the manufacturer's literature or documentation are mandatory requirements.

1.5 Delivery, Storage, and Handling

- A. Protect all equipment delivered and placed in storage from the weather, excessive humidity and temperature variations, dirt and dust, or other contaminants. All pipes must be either capped or plugged until installed.

1.6 Extra Materials

- A. Spare sprinklers and wrench(es) must be provided as spare parts in accordance with NFPA 13.

PART 2 PRODUCTS

2.1 Materials and Equipment

A. Standard Products

1. Provide materials, equipment, and devices listed for fire protection service when so required by NFPA 13 or this specification. Select material from one manufacturer, where possible, and not a combination of manufacturers, for a classification of material. Material and equipment must be standard products of a manufacturer regularly engaged in the manufacture of the products for at least 2 years prior to bid.

B. Nameplates

1. Major components of equipment must have the manufacturer's name, address, type or style, model or serial number, catalog number, date of installation, installing Contractor's name and address, and the contract number provided on a new name plate permanently affixed to the item or equipment. Nameplates must be etched metal or plastic, permanently attached by screws to control units, panels or adjacent walls.

C. Identification and Marking

1. Pipe and fitting markings must include name or identifying symbol of manufacturer and nominal size. Pipe must be marked with ASTM designation. Valves and equipment markings must have name or identifying symbol of manufacturer, specific model number, nominal size, name of device, arrow indicating direction of flow, and position of installation (horizontal or vertical), except if valve can be installed in either position. Markings must be included on the body casting or on an etched or stamped metal nameplate permanently on the valve or cover plate.

D. Pressure Rating

1. Valves, fittings, couplings, alarm switches, and similar devices must be rated for the maximum working pressures that can be experienced in the system, but in no case less than 175 psi.

2.2 Underground Piping Components

A. Pipe

1. Pipe must comply with NFPA 24. Minimum pipe size is 6 inches. Piping more than 5 feet outside the building walls must comply with Section 33 11 00 WATER UTILITY DISTRIBUTION PIPING. A continuous section of welded stainless steel fire water service piping from a point outside the building perimeter to a flanged fitting at least 1-foot above the finished floor within the building is acceptable.
- B. Fittings and Gaskets
1. Fittings must be ductile-iron cement mortar lining conforming to AWWA C104/A21.4. Gaskets must be suitable in design and size for the pipe with which such gaskets are to be used. Gaskets for ductile-iron pipe joints must conform to AWWA C111/A21.11.
- C. Gate Valve [and Indicator Posts]
1. Installation must comply with NFPA 24. Gate valves for use with indicator post must conform to UL 262. [Indicator posts must conform to UL 789. Provide each indicator post with one coat of primer and two coats of red enamel paint.]
- D. Valve Boxes
1. Except where indicator posts are provided, for each buried valve, provide a cast-iron, ductile-iron, or plastic valve box of a suitable size. Plastic boxes must be constructed of acrylonitrile-butadiene-styrene (ABS) or inorganic fiber-reinforced black polyolefin. Provide cast-iron, ductile-iron, or plastic cover for valve box with the word "WATER" cast on the cover. The minimum box shaft diameter must be 5.25 inches. Coat cast-iron and ductile-iron boxes with bituminous paint applied to a minimum dry-film thickness of 10 mils.
- E. Buried Utility Warning and Identification Tape
1. Provide detectable aluminum foil plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of buried piping. Tape must be detectable by an electronic detection instrument. Provide tape, 3 inches minimum width, color coded for the utility involved with warning and identification imprinted in bold block letters continuously and repeatedly over the entire tape length. Warning and identification must read "CAUTION BURIED WATER PIPING BELOW" or similar wording. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material.

2.3 Aboveground Piping Components

- A. Steel Piping Components
1. Steel Pipe
 - a. Except as modified herein, steel pipe must be black as permitted by NFPA 13 and conform to the applicable provisions of ASTM A53/A53M, ASTM A135/A135M or ASTM A153/A153M.
 - b. Steel pipe must be minimum Schedule 40 for sizes 2 inches and less; and minimum Schedule 10 for sizes larger than 2 inches.
 2. Fittings
 - a. Fittings must be welded, threaded, or grooved-end type. Threaded fittings must be cast-iron conforming to ASME B16.4, malleable-iron conforming to ASME B16.3 or ductile-iron conforming to ASTM A536. Plain-end fittings with mechanical couplings, fittings that use steel gripping devices to bite into the pipe, steel press fittings and field welded fittings are not permitted. Fittings, mechanical couplings, and rubber gaskets must be supplied by the same manufacturer. Threaded fittings must use Teflon tape or manufacturer's

approved joint compound. Saddle tees using rubber gasketed fittings are permitted only when connecting to existing piping for additions or modifications. Saddle tees must use a connection method that completely wraps around the pipe. Reducing couplings are not permitted except as allowed by NFPA 13.

3. Grooved Mechanical Joints and Fittings
 - a. Joints and fittings must be designed for not less than 175 psi service and the product of the same manufacturer. Field welded fittings must not be used. Fitting and coupling housing must be malleable-iron conforming to ASTM A47/A47M, Grade 32510; ductile-iron conforming to ASTM A536, Grade 65-45-12. Rubber gasketed grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 2 inches and larger. Gasket must be the flush type that fills the entire cavity between the fitting and the pipe. Nuts and bolts must be heat-treated steel conforming to ASTM A183 and must be cadmium-plated or zinc-electroplated.
4. Flanges
 - a. Flanges must conform to NFPA 13 and ASME 816.1. Gaskets must be non-asbestos compressed material in accordance with ASME 816.21, 1/16-inch thick, and full face or self-centering flat ring type.

B. Flexible Sprinkler Hose

1. The use of flexible hose is permitted. Flexible sprinkler hose must comply with UL 2443 and FM 1637.

C. Pipe Hangers and Supports

1. Provide galvanized pipe hangers, supports and seismic bracing in accordance with NFPA 13. Design and install seismic protection in accordance with the requirements of NFPA 13 section titled "Protection of Piping Against Damage Where Subject to Earthquakes for Seismic Design Category as designated by the Structural Engineer of Record.

D. Valves

1. Provide valves of types approved for fire service. Valves must open by counterclockwise rotation.
2. Control Valve
 - a. Manually operated sprinkler control/gate valve must be outside stem and yoke (OS&Y) type or butterfly type as indicated on the drawings and must be listed.
3. Check Valves
 - a. Check valves must comply with UL 312
4. Hose Valve
 - a. Valve must comply with UL 668.

2.4 Alarm Initiating and Supervisory Devices

A. Sprinkler Alarm Switch

1. Vane or pressure-type flow switch(es). Connection of switch must be by the fire alarm installer. Vane type alarm actuating devices must have mechanical diaphragm controlled retard device adjustable from 10 to 60 seconds and must instantly recycle. Flow switches for elevator power shunt must not have a retard feature.

B. Valve Supervisory (Tamper) Switch

1. Switch must be integral to the control valve or suitable for mounting to the type of control valve to be supervised open.

2.5 Backflow Prevention Assembly

- A. Reduced-pressure principle valve assembly backflow preventer complying with ASSE 1013, ASSE 1015 and AWWA M14. Each check valve must have a drain. Backflow prevention assemblies must have current "Certificate of Approval from the Foundation for Cross-Connection Control and Hydraulic Research, FCCCHR List" and be listed for fire protection use. Listing of the specific make, model, design, and size in the FCCCHR List is acceptable as the required documentation.
- B. Backflow Preventer Test Connection
 1. Test connection must consist of a series of listed hose valves with 2-1/2 inch National Standard male hose threads with cap and chain.

2.6 Fire Department Connection

- A. Fire department connection must be cast-brass body, matching escutcheon lettered "Auto Spkr" with a finish of architects approval. Female inlets must have 2 1/2-inch, minimum, diameter American National Fire Hose Connection Screw Threads (NH) per NFPA 1963.

2.7 Sprinklers

- A. Sprinklers must comply with UL 199 and NFPA 13. Sprinklers with internal O-rings are not acceptable. Sprinklers in high heat areas including attic spaces or in close proximity to unit heaters must have temperature classification in accordance with NFPA 13. Extended coverage sprinklers are permitted for loading docks, residential occupancies and high-piled storage applications only.
 1. Sprinkler Finishes: Provide sprinklers and matching escutcheons as indicated in the contract documents or as approved by Owner or Architect. All sprinklers are to be glass bulb type unless otherwise approved by Owner or Architect.
 2. Pendent Sprinkler
 - a. Pendent sprinkler must be recessed quick response type with nominal K-factor of 5.6. Pendent sprinklers must have an architect approved finish. Assembly must include an integral and matching escutcheon.
 3. Upright Sprinkler
 - a. Upright sprinkler must be quick-response type with architect approved finish and have a nominal K-factor of 5.6.
 4. Concealed Sprinkler
 - a. Concealed sprinkler must be quick response type and have a nominal K-factor of 5.6. Cover plate must be architect approved.

2.8 Accessories

- A. Sprinkler Cabinets
 1. Provide spare sprinklers in accordance with NFPA 13 and must be placed in a suitable metal or plastic cabinet of sufficient size to accommodate all the spare sprinklers and wrenches in designated locations. Spare sprinklers must be representative of, and in proportion to, the number of each type and temperature rating of the sprinklers installed as required by NFPA 13. At least one wrench of each type required must be provided.
- B. Pendent Sprinkler Escutcheon

1. Escutcheon must be one-piece metallic type with a depth of less than 3/4-inch and suitable for installation on pendent sprinklers. The escutcheon must have a factory finish that matches the pendent sprinkler.
- C. Pipe Escutcheon
1. Provide split hinge metal plates for piping entering walls, floors, and ceilings in exposed spaces. Provide polished stainless steel plates or chromium-plated finish on copper alloy plates in finished spaces. Provide paint finish on metal plates in unfinished spaces.
- D. Sprinkler Guard
1. Listed guard must be a steel wire cage designed to encase the sprinkler and protect it from mechanical damage. Guards must be provided on sprinklers located within 7 feet of the floor and/or as indicated.
- E. Relief Valve
1. Relief valves must be listed and installed at the riser in accordance with NFPA 13.
- F. Air Vent
1. Air vents must be of the automatic type and piped to drain to the building exterior.
- G. Identification Sign
1. Valve identification sign must be minimum 6 inches wide by 2 inches high with enamel baked finish on minimum 18 gage steel or 0.024-inch aluminum with red letters on a white background or white letters on red background. Wording of sign must include, but not be limited to "main drain", "auxiliary drain", "inspector's test", "alarm test", "alarm line", and similar wording as required to identify operational components. Where there is more than one sprinkler system, signage must include specific details as to the respective system.

PART 3 EXECUTION

3.1 Verifying Actual Field Conditions

- A. Before commencing work, examine all adjoining work on which the contractor's work that is dependent for perfect workmanship according to the intent of this specification section, and report to the Contracting Officer's Representative a condition that prevents performance of first class work. No "waiver of responsibility" for incomplete, inadequate or defective adjoining work will be considered unless notice has been filed before submittal of a proposal.

3.2 Installation

- A. The installation must be in accordance with the applicable provisions of NFPA 13, NFPA 24 and publications referenced therein. Locate sprinklers in a consistent pattern with ceiling grid, lights, and air supply diffusers. Install sprinkler system over and under ducts, piping and platforms when such equipment can negatively affect or disrupt the sprinkler discharge pattern and coverage.
1. Piping offsets, fittings, and other accessories required must be furnished to provide a complete installation and to eliminate interference with other construction.
 2. Wherever the contractor's work interconnects with work of other trades the Contractor must coordinate with other Contractors to ensure all Contractors have the information necessary so that they may properly install all necessary connections and equipment.
 3. Provide required supports and hangers for piping, conduit, and equipment so that loading will not exceed allowable loadings of structure. Submittal of a bid must be a deemed representation that the contractor submitting such bid has ascertained allowable loadings and has included in his estimates the costs associated in furnishing required supports.

- B. Waste Removal
 - 1. At the conclusion of each day's work, clean up and stockpile on site all waste, debris, and trash which may have accumulated during the day as a result of work by the contractor and of his presence on the job. Sidewalks and streets adjoining the property must be kept broom clean and free of waste, debris, trash and obstructions caused by work of the contractor, which will affect the condition and safety of streets, walks, utilities, and property.

3.3 Underground Piping Installation

- A. The fire protection water main must be laid, and joints anchored, in accordance with NFPA 24. Minimum depth of cover must be 3 feet or the frost line, whichever is deeper. The supply line must terminate inside the building with a flanged piece, the bottom of which must be set not less than 1-foot above the finished floor. A blind flange must be installed temporarily on top of the flanged piece to prevent the entrance of foreign matter into the supply line. A concrete thrust block must be provided at the elbow where the pipe turns up toward the floor. In addition, joints must be anchored in accordance with NFPA 24. Buried steel components must be provided with a corrosion protective coating in accordance with AWWA C203. Piping more than 5 feet outside the building walls must meet the requirements of Section 33 11 00 WATER UTILITY DISTRIBUTION PIPING.

3.4 Aboveground Piping Installation

- A. The methods of fabrication and installation of the aboveground piping must fully comply with the requirements and recommended practices of NFPA 13 and this specification section.
- B. Protection of Piping Against Earthquake Damage
 - 1. Seismic restraint is required.
- C. Piping in Exposed Areas
 - 1. Install exposed piping without diminishing exit access widths, corridors or equipment access. Exposed horizontal piping, including drain piping, must be installed to provide maximum headroom.
- D. Piping in Finished Areas
 - 1. In areas with suspended or dropped ceilings and in areas with concealed spaces above the ceiling, piping must be concealed above ceilings. Piping must be inspected, hydrostatically tested and approved before being concealed. Risers and similar vertical runs of piping in finished areas must be concealed.
- E. Pendent Sprinklers
 - 1. Drop nipples to pendent sprinklers must consist of minimum 1-inch pipe with a reducing coupling into which the sprinkler must be threaded.
 - 2. Where sprinklers are installed below suspended or dropped ceilings, drop nipples must be cut such that sprinkler ceiling plates or escutcheons are of a uniform depth throughout the finished space. The outlet of the reducing coupling must not extend below the underside of the ceiling.
 - 3. Recessed pendent sprinklers must be installed such that the distance from the sprinkler deflector to the underside of the ceiling must not exceed the manufacturer's listed range and must be of uniform depth throughout the finished area.
 - 4. Pendent sprinklers in suspended ceilings must be located in the center of the tile (plus or minus 2 inches).
 - 5. Dry pendent sprinkler assemblies must be such that sprinkler ceiling plates or escutcheons are of the uniform depth throughout the finished space.
 - 6. Where the maximum static or flowing pressure, whichever is greater at the sprinkler, applied other than through the fire department connection, exceeds 100 psi and a branch line above the ceiling supplies sprinklers in a pendent position below the ceiling, the

cumulative horizontal length of an unsupported arm-over to a sprinkler or sprinkler drop must not exceed 12 inches for steel pipe.

F. Upright Sprinklers

1. Riser nipples or "sprigs" to upright sprinklers must contain no fittings between the branch line tee and the reducing coupling at the sprinkler.

G. Pipe Joints

1. Pipe joints must conform to NFPA 13, except as modified herein. Not more than four threads must show after joint is made up. Welded joints will be permitted, only if welding operations are performed as required by NFPA 13 at the Contractor's fabrication shop, not at the project construction site. Flanged joints must be provided where indicated or required by NFPA 13. Grooved pipe and fittings must be prepared in accordance with the manufacturer's latest published specification according to pipe material, wall thickness and size. Grooved couplings, fittings and grooving tools must be products of the same manufacturer. For copper tubing, pipe and groove dimensions must comply with the tolerances specified by the coupling manufacturer. The diameter of grooves made in the field must be measured using a "go/no-go" gauge, vernier or dial caliper, narrow-land micrometer, or other method specifically approved by the coupling manufacturer for the intended application. Groove width and dimension of groove from end of pipe must be measured and recorded for each change in grooving tool setup to verify compliance with coupling manufacturer's tolerances.

H. Reducers

1. Reductions in pipe sizes must be made with one-piece tapered reducing fittings. When standard fittings of the required size are not manufactured, single bushings of the face or hex type will be permitted. Where used, face bushings must be installed with the outer face flush with the face of the fitting opening being reduced. Bushings cannot be used in elbow fittings, in more than one outlet of a tee, in more than two outlets of a cross, or where the reduction in size is less than 1/2-inch.

I. Pipe Penetrations

1. Cutting structural members for passage of pipes or for pipe-hanger fastenings will not be permitted. Pipes that must penetrate concrete or masonry walls or concrete floors must be core-drilled and provided with pipe sleeves. Each sleeve must be Schedule 40 galvanized steel, ductile-iron or cast-iron pipe and extend through its respective wall or floor and be cut flush with each wall surface. Sleeves must provide required clearance between the pipe and the sleeve per NFPA 13. The space between the sleeve and the pipe must be firmly packed with mineral wool insulation.
2. Where pipes and sleeves penetrate fire walls, fire partitions, or floors, pipes/sleeves must be firestopped.
3. In penetrations that are not fire-rated or not a floor penetration, the space between the sleeve and the pipe must be sealed at both ends with plastic waterproof cement that will dry to a firm but pliable mass or with a mechanically adjustable segmented elastomer seal.

J. Escutcheons

1. Escutcheons must be provided for pipe penetration in finished areas of ceilings, floors and walls. Escutcheons must be securely fastened to the pipe at surfaces through which piping passes.

K. Inspector's Test Connection

1. Unless otherwise indicated, the test connection must consist of 1-inch pipe connected at the riser as a combination test and drain valve; a test valve located approximately 7 feet above the floor; a smooth bore brass outlet equivalent to the smallest orifice sprinkler used in the system; and a painted metal identification sign affixed to the valve with the words "Inspector's Test". All test connection piping must be inside of the building and penetrate

the exterior wall at the location of the discharge orifice only. The discharge orifice must be located outside the building wall no more than 2 feet above finished grade, directed so as not to cause damage to adjacent construction or landscaping during full flow discharge, or to the sanitary sewer. Discharge to the exterior must not interfere with exiting from the facility. Water discharge or runoff must not cross the path of egress from the building. Do not discharge to the roof. Discharge to floor drains, janitor sinks or similar fixtures is not permitted.

2. Provide concrete splash block at drain and inspector's test connection discharge locations if not discharging to a concrete surface. Splash blocks must be large enough to mitigate erosion and not become dislodged during a full flow of the drain. Ensure all discharged water drains away from the facility and does not cause property damage.

L. Backflow Preventer

1. Locate within the building or in a heated enclosure in locations subject to freezing. For heated enclosures, provide a low temperature supervisory alarm connected to the facility fire alarm system. Heat trace is not permitted to be used.
2. Install backflow preventers so that the bottom of the assembly is a minimum of 6 inches above the finished floor/grade. Install horizontal backflow preventers so that the bottom of the assembly is no greater than 24 inches above the finished floor/grade. Install vertical backflow preventers so that the upper operating handwheel is no more than 6 feet above the finished floor/grade. Clearance around control valve handles must be minimum 6 inches above grade/finished floor and away from walls.
3. Test Connection
 - a. Provide downstream of the backflow prevention assembly UL 668 hose valves with 2.5-inch National Standard male hose threads with cap and chain. Provide one valve for each 250 gpm of system demand or fraction thereof. Provide a permanent sign in accordance with paragraph entitled "Identification Signs" which reads, "Test Valve". Indicate location of test header. If an exterior connection, provide a control valve inside a heated mechanical room to prevent freezing.

M. Drains

1. Main drain piping must be provided to discharge at a safe point outside the building, no more than 2 feet above finished grade, or to the sanitary sewer where dictated by jurisdiction. Provide a concrete splash block at drain outlet. Discharge to the exterior must not interfere with exiting from the facility. Water discharge or runoff must not cross the path of egress from the building.
2. Auxiliary drains must be provided as required by NFPA 13. Auxiliary drains are permitted to discharge to a floor drain if the drain is sized to accommodate full flow (min 40 gpm). Discharge to service sinks or similar plumbing fixtures is not permitted.

N. Identification Signs

1. Signs must be affixed to each control valve, inspector test valve, main drain, auxiliary drain, test valve, and similar valves as appropriate or as required by NFPA 13.

3.5 Electrical

- A. Alarm signal wiring connected to the building fire alarm control system must be by the fire alarm installer.

3.6 Field Quality Control

- A. Correction of Deficiencies

1. If equipment was found to be defective or non-compliant with contract requirements, perform corrective actions and repeat the tests. Tests must be conducted and repeated if necessary until the system has been demonstrated to comply with all contract requirements.

3.7 Minimum System Tests

- A. The system, including the underground water mains, and the aboveground piping and system components, must be tested to ensure that equipment and components function as intended. The underground and aboveground interior piping systems and attached appurtenances subjected to system working pressure must be tested in accordance with NFPA 13 and NFPA 24.
- B. Underground Piping
 1. Flushing
 - a. Underground piping must be flushed at a minimum of 10 fps in accordance with NFPA 24.
 2. Hydrostatic Test
 - a. New underground piping must be hydrostatically tested in accordance with NFPA 24.
- C. Aboveground Piping
 1. Hydrostatic Test
 - a. Aboveground piping must be hydrostatically tested in accordance with NFPA 13. There must be no drop in gauge pressure or visible leakage when the system is subjected to the hydrostatic test. The test pressure must be read from a gauge located at the low elevation point of the system or portion being tested.
 2. Backflow Prevention Assembly Forward Flow Test
 - a. Each backflow prevention assembly must be tested at system flow demand, including all applicable hose streams, as specified in NFPA 13. The Contractor must provide all equipment and instruments necessary to conduct a complete forward flow test, including 2.5-inch diameter hoses, playpipe nozzles or flow diffusers, calibrated pressure gauges, and pitot tube gauge. The Contractor must provide all necessary supports to safely secure hoses and nozzles during the test. At the system demand flow, the pressure readings and pressure drop (friction loss) across the assembly must be recorded. A metal placard must be provided on the backflow prevention assembly that lists the pressure readings both upstream and downstream of the assembly, total pressure drop, and the system test flow rate determined during the preliminary testing. The pressure drop must be compared to the manufacturer's data and the readings observed during the final inspections and tests.
- D. Main Drain Flow Test
 1. Following flushing of the underground piping, a main drain test must be made to verify the adequacy of the water supply.

3.8 System Acceptance

- A. Following acceptance of the system, as-built drawings and O&M manuals must be delivered to the Contracting Officer for review and acceptance. Submit six sets of detailed as-built drawings. The drawings must show the system as installed, including deviations from both the project drawings and the approved shop drawings. These drawings must be submitted within two weeks after the final

acceptance test of the system. At least one set of as-built (marked-up) drawings must be provided at the time of, or prior to the final acceptance test.

1. Provide one set of full size paper as-built drawings and schematics. The drawings must be prepared electronically and sized no less than the contract drawings.
2. Provide operating and maintenance (O&M) instructions.

3.9 Onsite Training

- A. Conduct a training course for the responding fire department and operating and maintenance personnel as designated by the Contracting Officer. The on-site training must cover all of the items contained in the approved Operating and Maintenance Instructions.

END OF SECTION

SECTION 22 00 10

BASIC PLUMBING REQUIREMENTS

PART 1. GENERAL

1.1 SECTION INCLUDES

- A. Basic Plumbing Requirements specifically applicable to Division 22 Sections, in addition to Division 01 - General Requirements.

1.2 DESCRIPTION

- A. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as required to complete the work of this section, except as otherwise herein specifically excluded.

1.3 WORK INCLUDED

- A. The complete Plumbing systems (including Fire Protection systems), including but not limited to these major items.
 1. Coordinate work of this Section with related trades.
 2. Verify applicable dimensions and location of existing utilities at the jobsite.
 3. Furnishing and installation of miscellaneous hangers, supports, sleeves, inserts, anchors and other auxiliary equipment for systems under this Division.
 4. Soil waste and vent system inside and 5 feet outside the building including connections to fixtures, sewer connections and clean-outs.
 5. Water piping systems inside and 5 feet outside the building, including connections to fixtures.
 6. Plumbing fixtures, carriers, fittings, trim, and accessories.
 7. Natural gas piping system including connections to equipment.
 8. Shop drawings.
 9. Systems adjustments and balancing.
 10. Written operating and maintenance instructions.
 11. Record drawings.
 12. Guarantee

1.4 WORK SPECIFIED ELSEWHERE

- A. Concrete, Rough Carpentry, Joint Sealants, Sheet Metal, Flashing and Trim, access doors and Frames, Door Hardware, Paints and Coatings, Mechanical and Electrical.

1.5 SITE INSPECTION

- A. Contractor shall familiarize himself with the conditions at the site. No allowance will be made subsequently for any error through negligence in observing the site conditions. Contractor shall observe and make cost allowance for any mechanical and/or electrical items that must be relocated to accommodate the installation or servicing of any item covered under this contract.

1.6 ORDINANCES, REGULATIONS AND CODES

- A. References to Technical Societies, Trade Organizations, Governmental Agencies is made in Division 15 in accordance with the following abbreviations.
 1. AFI - Air Filter Institute
 2. AMCA - Air Moving & Conditioning Association
 3. ARI - Air Conditioning & Refrigeration Institute
 4. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
 5. ASME - American Society of Mechanical Engineers

6. ASTM - American Society of Testing Materials
7. AWSC - American Welding Society Code
8. ANSI - American National Standards Institute
9. CBC - California Building Code
10. CCR - California Code of Regulations
11. CEC - California Electrical Code
12. CFC - California Fire Codes
13. CMC - California Mechanical Code
14. CPC - California Plumbing Code
15. FIA - Factory Insurance Association
16. NAFM - National Association of Fan Manufacturers
17. NEMA - National Electrical Manufacturer's Association
18. NFPA - National Fire Protection Association
19. ORS - Office of Regulatory Services
20. SCAQMD - South Coast Air Quality Management District
21. SMACNA - Sheet Metal and Air Conditioning Contractors National Association
22. UFC - Uniform Fire Code
23. UL - Underwriter's Laboratories
24. UPC - Uniform Plumbing Code

- B. Requirements of Regulatory Agencies: Materials and installation shall comply with applicable local, state, and national codes and ordinances. Rulings and interpretations of the enforcing agencies shall be considered as part of the local codes. No extras will be permitted for furnishing items required by the local codes but not specified or shown on the drawings.
- C. Codes and Standards:
1. IBC and California Amendments (California Building Code - Part 2, Title 24, CCR).
 2. UMC and California Amendments (California Mechanical Code - Part 4, Title 24 CCR).
 3. UPC and California Amendments (California Plumbing Code - Part 5, Title 24 CCR).
 4. Uniform Fire Code with State Amendments (California Fire Code - Part 9, Title 24 CCR).
 5. National Fire Protection Associations - National Fire Code.
- D. Nothing in these drawings and specifications is to be construed to permit work in violation thereof. Ordinances, regulations and codes are to be construed as minimum requirements.
- E. The responsibility of the Architect to conduct construction reviews of the Contractor's performance is not intended to include the adequacy of the Contractor's safety measures in, on, or near the construction site.
- F. Ventilating, refrigeration and electrical equipment and appliances are required to be approved by the Underwriters' Laboratories, Inc., or other nationally recognized testing agency and installed per the testing agency's specifications.

1.7 PERMITS, FEES AND INSPECTIONS

- A. Obtain and pay for all necessary permits, fees, assessments, complimentary drawings, required by any legally constituted public authorities having jurisdiction.

1.8 DRAWINGS AND SPECIFICATIONS

- A. The Architect's decision will be final on interpretation of the Drawings and Specifications.
- B. The Drawings and Specifications are complimentary. Any work called for on the Drawings and not mentioned in the Specifications, or vice versa, shall be performed as though fully set forth in both.
- C. Piping, ductwork and other equipment shown as existing has been taken from the Owner's drawings. Contractor shall verify exact location in field before proceeding with the work.

- D. Where codes, standards, drawings or specifications conflict, the most stringent shall prevail, unless prior approval for variance is obtained. Specific details on the drawings shall supersede the specification in the event of a conflict.
- E. Alternate support or seismic detail proposed by contractor shall have prior approval by the Architect; and the Contractor shall obtain agency approval without any additional cost or time to the contract and without any time penalty on the work schedule.

1.9 SUBMITTALS

- A. Before starting work, the Contractor shall furnish for the review of the Architect and Engineer. Provide Shop Drawings and Submittals with Itemized Equipment Lists, complete in all details that they propose to install. All items shall be submitted at the same time.
- B. Submittals must be specific to this project with respect to model number, capacities, performance, etc., generic submittals will not be accepted.
- C. Variations or deviations on submitted items from that specified must be clearly tagged and / or identified.
- D. Submittals shall include, but not necessarily be limited to the following which are mandatory:
 1. Draw Equipment Layouts to 1/4" scale, including equipment, piping accessories, and showing clearances for operating and servicing.
 2. Schedule of pipe, fittings, valves, with manufacturer and catalog number.
 3. Specialties, valves, gauges and thermometers of all types.
 4. Foundations, supports, hangers, inserts.
 5. Shop fabrication drawings and installation drawings of ductwork and piping layouts. Submit for approval prior to fabrication. Drawings shall indicate dimensions from bottom of piping and ductwork to finish floor level.
 6. Wiring diagrams, control panel board, motor starters and controls for electrically operated equipment furnished by mechanical trades.
 7. Access panels.
 8. Fixture carriers.
 9. Hangers, inserts, supports, anchors.
 10. Pipe, fittings and specialties.
 11. Pipe isolators.
 12. Plumbing fixtures, fittings, trim.
 13. Shower.
 14. Roof flashing.
 15. Sleeves, escutcheons, caulking, waterproofing, fireproofing.
 16. Water hammer arrestors.
 17. Shop fabrications drawings and calculations.
 18. Special and miscellaneous products furnished under this section and not listed herein.

1.10 RECORD DRAWINGS AND MANUALS

- A. Record Set During the Work: At site, maintain at least one set of Drawings as a Field Record Set. Also maintain at least one copy of all Addenda, Modifications, approved submittals, correspondence, and transmittals at site. Keep Drawings and data in good order and readily available to Architect and Owner.
- B. Changes: Clearly and correctly mark Record Drawings to show changes made during the construction process at the time the changed work is installed. No such changes shall be made in the work unless authorized by the Architect.
- C. Final Record Drawings: Conform to Division 1 requirements.
- D. Preparation of Final Record Drawings: Contractor shall transfer recorded changes in the work indicated on the Field Record Set to the record set. Changes shall be neatly and clearly drawn and noted by skilled draftsmen, and shown technically correct.

- E. Approval: Prior to Architect's inspection for Substantial Completion, submit the Final Record Drawings to the Architect for review, and make such revisions as may be necessary for Final Record Drawings to be a true, complete, and accurate record of the work.
- F. Manuals: Obtain data from the various manufacturers and submit instruction, operation, and maintenance manuals as required and to the extent required under other Sections.
- G. Contents: Each manual shall have an index listing the contents. Information in the manuals shall include not less than:
 - 1. General introductions and overall equipment description, purpose, functions and simplified theory of operation.
 - 2. Specifications
 - 3. Installation instructions, procedures, sequences, and precautions, including tolerances for level, horizontal and vertical alignment.
 - 4. Grouting requirements.
 - 5. List showing lubricants for each item of mechanical equipment and recommended lubrication intervals.
 - 6. Start-up and beginning operation procedures.
 - 7. Operational procedures.
 - 8. Shutdown procedures.
 - 9. Maintenance and calibration procedures
 - 10. Parts lists
 - 11. Name, address and telephone number of each manufacturer's local representative.
- H. Manual Submittals: Unless otherwise specified, each submittal shall include two copies of each manual, one of which will be returned to the Contractor, marked to show the required review. When approved, deliver four copies to Architect unless otherwise specified.
- I. "As-Built" drawings of ductwork and piping, including all elbows, transitions, damper and valve locations shall be provided prior to commencement of air and water balance.

1.11 QUALITY OF EQUIPMENT, MATERIALS AND WORKMANSHIP

- A. Unless otherwise specified, equipment and materials used in the installation shall be new and in perfect condition when installed. Articles provided for the same general purpose or use shall be of the same make. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. Furnish the services of an experienced superintendent, who shall be constantly in charge of the work, together with all necessary journeymen, helpers and laborers required.

1.12 SEISMIC DESIGN

- A. Contractor shall be responsible for anchors and connections of mechanical work to the building structure including calculations for approval by structural engineer or for approval by inspector of record, as applies, for items or work, where approval is deferred or where alternate support or anchorage detail is proposed to prevent damage as a result of an earthquake, including manufactured equipment, the connection and integrity of shop fabricated and field fabricated materials and equipment. The anchorage of all pipes, ducts, conduits, fixtures, equipment, etc. shall withstand the lateral forces and shall accommodate calculated building displacement as required by the California Building Code, and local city/county codes. (Building equipment and connections therefore shall be designed to resist lateral seismic forces equal to 1.0 of equipment weight to working allowable stress. Cantilever posts supporting equipment shall be designed to resist lateral seismic forces equal to 0.5 of equipment weight to allowable working stress. Conform to the following:
 - 1. In accordance with Title 24, 2022 CBC Chapter 16A, details shall be provided for the seismic anchorage of all mechanical and electrical equipment, anchorage details shall be based upon appropriate design calculations.
 - 2. For equipment weighing 400 pounds or more anchorage details and appropriate design calculations shall be submitted as part of the mechanical and electrical

drawings. "Deferred Approval" items will not be permitted unless specifically approved by the plan check supervisor.

- a. Exception: Attachments of equipment weighting less than 400 pounds and supported directly on the floor or roof structure, furniture, or temporary or movable equipment and equipment weighing less than 20 pounds that is supported by vibration isolation devices suspended from the roof, wall or floor, need not be detailed on the plans provided the following notes are included on the mechanical and electrical plans.
3. The seismic anchorage of mechanical and electrical equipment shall conform to C.C.R. Title 24, 2022 CBC Chapter 16A. Anchorage details for roof/floor-mounted equipment shall be shown on plans.

1.13 SUBSTITUTIONS AND CHANGES

- A. The design has been based on data from certain manufacturers, suitable for each application. Recommendations for alternative manufacturers are made for each product, except when "no substitutions permitted" is indicated.
- B. It is the intent of the Owner to have this project constructed with materials, products and system originally designed and specified into the project.
- C. Alternatives that may require the modification, realignment and/or adjustment of other associated components, including impact on other trades, shall be accomplished at no additional cost or time to the contract and shall have the approval of the Architect.
- D. Substitutions shall be submitted addressing all features listed in the specifications. Features that deviate from the plans and specifications shall be clearly identified including justification for deviations. Design West Engineers will review initial submittal on substitutes only. Subsequent submittals made to correct deficiencies in original submittals will be reviewed at Contractor's expense based on Design West Engineer's hourly rate for engineering services.
- E. Should the Contractor elect to propose substitutions for the Owner's interest, the substitutions shall be in compliance with Division 01.

1.14 SUBMITTAL REVIEWS

- A. The Architect will have the right to accept or reject equipment, materials, workmanship, tests and determine when the Contractor has complied with the requirements herein specified.

1.15 SELECTION AND ORDERING OF EQUIPMENT AND MATERIALS

- A. Immediately after award of the Contract and after the final review of submittals by the Architect and / or Engineer, the Contractor shall arrange for the purchase and delivery of equipment and materials required, in ample quantities and at the proper time to meet construction schedule. The contractor shall deliver to the Architect and Owner a complete list of equipment and materials ordered, giving descriptions, plate numbers, brochures, name of the wholesalers, date of the orders and approximate delivery dates.

1.16 LOCATIONS AND ACCESSIBILITY

- A. Drawings show pipe and ductwork diagrammatically. Conform to Drawings as closely as possible in layout work. Vary run of piping, run and shape of ductwork and make offsets during progress of work as required to meet structural and other interferences as reviewed by Architect and / or Engineer. Install piping and ductwork to best suit field conditions after coordinating with other trades. Run exposed piping and ductwork parallel to, or at right angle to, building walls. Keep horizontal lines as close to bottom of structures as possible. Conform to ceiling heights established on Drawings.

- B. Install equipment in such a manner as to be readily accessible for maintenance and repairs. Install piping, ducts and conduit in such a manner as to preserve headroom, avoid obstructions and keep openings and passageways clear.
- C. Installation at valves, thermometers, gauges, cleanouts, dampers, controls, steam and water specialties, duct access doors or any other indicating equipment or specialties requiring reading, adjustment, inspection, maintenance shall be conveniently and accessible located with reference to the finished building.
- D. Where wall and ceiling access doors are required but not shown, such doors shall be furnished under other sections and as directed by the Architect. Coordinate this requirement with appropriate trade.
- E. If changes in the indicated locations or arrangements are required, they shall be made without additional charges.
- F. In an existing area, where required, remove, reinstall, reconnect or replace, etc., any existing work to accommodate new work without any additional cost to the Owner. Material shall match existing, unless otherwise specified or approved in writing by the Architect.
- G. Provide sheaves and belts if required, to Test, Adjust and Balance Agency, to allow air moving equipment to meet flow requirements specified at no additional cost to the Owner.

1.17 COORDINATION OF TRADES

- A. Contractor shall coordinate all trades in the interest of obtaining the most practical overall arrangement of equipment, piping, conduit, and ducts and to maintain maximum headroom and accessibility.
- B. No extras will be allowed for changes made necessary by interference or coordination between trades.
- C. Submit Composite Coordination Drawings in accordance with Special Conditions. Include dimensioned plans, elevations, sections and details and give complete information particularly as to the kinds and types of materials and equipment, size and location of sleeves, inserts, attachments, chases, openings, conduits, ducts, boxes, lighting, structural interferences. Coordinate these Composite Coordination Drawings and field layouts in the field for proper relationship to work of applicable trades based on field conditions. Contractor shall have competent personnel readily available for coordinating, checking, and supervision of field layouts. The procedures for submittals and resubmittals, and final distribution shall be as specified in Division 01. Do not start installation of work involved under Composite Coordination Drawings until the Architect and Engineer reviews applicable submittal. Discrepancies between the Drawings and Composite Coordination Drawings shall be specifically noted and identified on the Composite Coordination Drawings. Drawings for the various trades involved shall be submitted as required and reviewed prior to preparation of Composite Coordination Drawings.
 - 1. Equipment Foundations and Bases: Furnish certified details and drawings for approval before fabrication. Furnish parts necessary for each foundation sub base and support.
 - 2. Pipe Sleeves and Inserts: Furnish and install pipe sleeves and pipe support inserts before concrete is poured.
 - 3. Roof, Wall and Floor Openings: Furnish Shop Drawings showing exact locations and sizes of openings through roofs, walls and floors.
 - 4. Concrete: Conform to Concrete Section of the Specifications.

1.18 GUARANTEES

- A. Contractor shall guarantee workmanship, equipment and materials installed under his contract for a period of not less than one (1) year from the date of Substantial Completion. Should any defects occur during this period, the Contractor shall promptly repair or replace the defective

item and any other damage caused to the building free of charge to the Owner, including cost of labor and materials.

- B. Guarantee included in this section to cover:
 - 1. Faulty or inadequate design of equipment or material installed
 - 2. Improper assembly or erection
 - 3. Defective workmanship or material
 - 4. Incorrect or inadequate operation or other failure
- C. The Contractor shall guarantee the complete and perfect operation of the entire system and that equipment will be supported in such a way as to be free of objectionable vibration and noise
- D. Furnish the parts and labor to replace any items found to be defective in the refrigeration equipment with the guarantee period
- E. In addition to other guarantees, furnish free maintenance for the refrigeration equipment, including replacement of refrigerant and oil, for a period of one (1) year. This shall include regular monthly maintenance and "On Call" service if required.
- F. For equipment bearing a manufacturer's warranty in excess of one year, furnish a copy of the warranty and proof of shipment date or purchase date per terms of warranty to the Owner, who shall be named as beneficiary.

1.19 PROTECTION OF EQUIPMENT AND MATERIALS

- A. Provide adequate storage facilities for equipment and materials on the site and shall make provisions to protect such materials and equipment from damage.

1.20 CLOSING-IN OF UNINSPECTED WORK

- A. Contractor shall not allow or cause any of the work, specifically ductwork and piping, to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Should any of work be covered up or enclosed before such inspection and test, shall at their own expense, uncover the work and after it has been inspected, tested, and approved, make repairs with such materials as may be necessary to restore work to its original and proper condition.

1.21 BUILDING FOOTING CLEARANCES

- A. Under no circumstances shall pipes, ducts, or conduits penetrate footings. They shall cross below footings or through sleeves above footings. Those running parallel to footings shall have the minimum clearance from the cone of influence indicated on the Drawings or as required by Code.

1.22 DAMAGE BY LEAKS

- A. Contractor shall be responsible for all damage to any part of the premises caused by rain leaks through or around ducts or pipes, leaks or breaks in piping, equipment or fixtures furnished or installed by him for a period of one (1) year from the date of Substantial Completion.

1.23 EQUIPMENT LABELS

- A. Equipment provided under this Section shall be provided with the manufacturer's metal identification labels attached to each individual piece of equipment showing complete performance characteristics, size, model and serial number.

1.24 PRELIMINARY OPERATION

- A. Should the Owner request that any portion of the plant, apparatus, or equipment be operated for the Owner's beneficial use prior to the final completion and acceptance of the work, the Contractor shall conform to Beneficial Occupancy Provisions of the General Conditions. Such operation shall be under the supervision and direction of the Contractor. Such preliminary operation shall not be construed as an acceptance of any of the work.

1.25 MAINTAINING EXISTING SERVICES

- A. The premises and existing building at the site will be in use at the time the work of this Section is in progress. Contractor shall conduct his work so as to cause no inconvenience or danger to the personnel on the premises.
- B. He shall maintain continuity of service to the existing mechanical systems, except for designated intervals during which connections can be made. The scheduling of the shutdown period shall be at a time directed by the Architect.
- C. In some instances, it may be necessary to defer work in certain areas and locations until such time as existing facilities can be relocated or rearranged by the Owner. Therefore, whenever it becomes necessary for the Contractor to perform work under this contract in areas in which the Owner's work is being performed. This contractor shall advise the Architect relative to this requirement and shall follow closely the directive issued by the Architect insofar as time and procedure are concerned. Allow Owner 72 hours prior notice.
- D. This contractor shall include in his bid all premium time to which he may be subjected for performing work in such procedure and at such time as may be necessary to cause the least interference with the function of the Owner.

1.26 ELECTRICAL WORK

- A. Coordinate with Division 26 in making the line and low voltage electrical connections and be responsible for the operation of the equipment furnished under this section.
- B. Voltage for electrical work will be included in Division 26. However, any control wiring which is required that is not shown on the control diagram shall be as described under this Section. In the event that the Contractor chooses to provide equipment that requires extra expense in the power or control wiring, he shall pay additional electrical costs.
- C. Safety switches, starters, circuit breakers, unless provided as a portion of package equipment, and the electrical connections of mechanical equipment to the electrical power service shall be provided under Division 26.
- D. Interconnecting wiring, safety switches, relays, controllers, and motor starters which are integral components of packaged equipment shall be provided as an integral part of that equipment.
- E. All interconnecting power wiring and conduits shall be provided by Division 26.
- F. Control wiring shall be provided by Division 22, unless otherwise indicated on the drawings.
- G. Conduit for control wiring shall be provided by Division 26.

END OF SECTION

SECTION 22 05 17

SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sleeves.
 - 2. Sleeve-seal systems.
 - 3. Grout.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 PRODUCTS

2.1 SLEEVES

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.
- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- E. Galvanized-Steel-Sheet Sleeves: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

2.2 SLEEVE-SEAL SYSTEMS

- A. Manufactures: Subject to compliance with requirements, provide product indicated on drawings or comparable product by one of the following:
 - 1. Advance Products & Systems, Inc
 - 2. CALPICO, Inc
 - 3. Metraflex Company
 - 4. Pipeline Seal and Insulator, Inc
 - 5. Proco Products, Inc

- B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 - 1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 2. Pressure Plates: Carbon steel.
 - 3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch (25-mm) annular clear space between piping and concrete slabs and walls.
 - 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.
 - 2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - 2. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
 - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 079200 "Joint Sealants."

- E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller than NPS 6 (DN 150): Cast-iron wall sleeves.
 - b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves.
 - 2. Exterior Concrete Walls below Grade:
 - a. Piping Smaller than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
 - 3. Concrete Slabs-on-Grade:
 - a. Piping Smaller than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
 - 4. Concrete Slabs above Grade:
 - a. Piping Smaller than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.
 - b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-pipe sleeves.

5. Interior Partitions:
 - a. Piping Smaller than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.
 - b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION

SECTION 22 05 18

ESCUTCHEONS FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
- C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

2.2 FLOOR PLATES

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.

- c. Insulated Piping: One-piece, stamped-steel type.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
 - i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type.
 - j. Bare Piping in Equipment Rooms: One-piece, cast-brass type with rough-brass finish.
 - k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type.
- C. Install floor plates for piping penetrations of equipment-room floors.
 - D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. New Piping: One-piece, floor-plate type.

3.2 FIELD QUALITY CONTROL

- A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION

SECTION 22 05 23

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Brass ball valves.
 - 2. Bronze ball valves.
 - 3. Bronze swing check valves.
 - 4. Iron swing check valves.
 - 5. Bronze gate valves.
 - 6. Iron gate valves.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.3 QUALITY ASSURANCE

- A. ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
- B. NSF Compliance: NSF 61 for valve materials for potable-water service.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 8 (DN 200) and larger.
 - 2. Handwheel: For valves other than quarter-turn types.
 - 3. Handlever: For quarter-turn valves NPS 6 (DN 150) and smaller except plug valves.
- E. Valves in Insulated Piping: With 2-inch (50-mm) stem extensions and the following features:
 - 1. Gate Valves: With rising stem.

2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
3. Butterfly Valves: With extended neck.

F. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves.
2. Solder Joint: With sockets according to ASME B16.18.
3. Threaded: With threads according to ASME B1.20.1.

2.2 BRASS BALL VALVES

A. One-Piece, Reduced-Port, Brass Ball Valves with Brass Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Kitz Corporation.
 - b. Nibco
2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 400 psig (2760 kPa).
 - c. Body Design: One piece.
 - d. Body Material: Forged brass.
 - e. Ends: Threaded.
 - f. Seats: PTFE or TFE.
 - g. Stem: Brass.
 - h. Ball: Chrome-plated brass.
 - i. Port: Reduced.

B. Two-Piece, Full-Port, Brass Ball Valves with Brass Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Flow-Tek, Inc.; a subsidiary of Bray International, Inc.
 - c. Hammond Valve.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).

- d. Body Design: Two piece.
- e. Body Material: Forged brass.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Brass.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

C. Two-Piece, Regular-Port, Brass Ball Valves with Brass Trim:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hammond Valve.
 - b. Milwaukee Valve Company.
- 2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Two piece.
 - e. Body Material: Forged brass.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Brass.
 - i. Ball: Chrome-plated brass.
 - j. Port: Regular.

2.3 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. Crane Co.; Crane Valve Group; Crane Valves.
 - d. Hammond Valve.
 - e. Milwaukee Valve Company.
 - f. NIBCO INC.
- 2. Description:
 - a. Standard: MSS SP-110.

- b. SWP Rating: 150 psig (1035 kPa).
- c. CWP Rating: 600 psig (4140 kPa).
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Bronze.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

2.4 BRONZE SWING CHECK VALVES

- A. Class 125, Bronze Swing Check Valves with Bronze Disc:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Valve, Inc.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Crane Co.; Crane Valve Group; Jenkins Valves.
 - d. Hammond Valve.
 - e. Milwaukee Valve Company.
 - f. NIBCO INC.
 - 2. Description:
 - a. Standard: MSS SP-80, Type 3.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B 62, bronze.
 - e. Ends: Threaded.

2.5 IRON SWING CHECK VALVES

- A. Class 125, Iron Swing Check Valves with Nonmetallic-to-Metal Seats:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Stockham Division.
 - 2. Description:
 - a. Standard: MSS SP-71, Type I.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Design: Clear or full waterway.

- d. Body Material: ASTM A 126, gray iron with bolted bonnet.
- e. Ends: Flanged.
- f. Trim: Composition.
- g. Seat Ring: Bronze.
- h. Disc Holder: Bronze.
- i. Disc: PTFE or TFE.
- j. Gasket: Asbestos free.

2.6 BRONZE GATE VALVES

A. Class 125, NRS Bronze Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Valve, Inc.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Crane Co.; Crane Valve Group; Jenkins Valves.
 - d. Crane Co.; Crane Valve Group; Stockham Division.
 - e. Hammond Valve.
 - f. Milwaukee Valve Company.
 - g. NIBCO INC.
- 2. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
 - d. Ends: Threaded or solder joint.
 - e. Stem: Bronze.
 - f. Disc: Solid wedge; bronze.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.

B. Class 125, RS Bronze Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Valve, Inc.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Crane Co.; Crane Valve Group; Jenkins Valves.

- d. Hammond Valve.
 - e. Milwaukee Valve Company.
 - f. Nibco Inc.
2. Description:
- a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
 - d. Ends: Threaded or solder joint.
 - e. Stem: Bronze.
 - f. Disc: Solid wedge; bronze.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.

PART 3 EXECUTION

3.1 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Shut-off valves shall be provided in main branches, runs to risers and where indicated on drawings
- C. Locate valves for easy access and provide separate support where necessary.
- D. Install valves in horizontal piping with stem at or above center of pipe.
- E. Install valves in position to allow full stem movement.
- F. Install on operators for butterfly valves NPS 4 (DN 100) and larger and more than 96 inches (2400 mm) above floor. Extend chains to 60 inches (1520 mm) above finished floor.
 - 1. Install swing check valves for proper direction of flow and in horizontal position with hinge pin level.

3.2 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball or butterfly valves.
 - 2. Throttling Service: ball, or butterfly valves.
 - 3. Pump-Discharge Check Valves:

- a. NPS 2 (DN 50) and Smaller: Bronze swing check valves with bronze disc.
 - b. NPS 2-1/2 (DN 65) and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring.
 - c. NPS 2-1/2 (DN 65) and Larger for Sanitary Waste and Storm Drainage: Iron swing check valves with lever and weight or spring.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
- 1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 - 3. For Copper Tubing, NPS 5 (DN 125) and Larger: Flanged ends.
 - 4. For Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.
 - 5. For Steel Piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 - 6. For Steel Piping, NPS 5 (DN 125) and Larger: Flanged ends.

3.4 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 2 (DN 50) and Smaller:
- 1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Bronze Angle Valves: Class 125, bronze disc.
 - 3. Ball Valves: Two piece, full port, brass or bronze with brass trim.
 - 4. Bronze Swing Check Valves: Class 125, bronze or nonmetallic disc.
- B. Pipe NPS 2-1/2 (DN 65) and Larger:
- 1. Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to NPS 100): May be provided with threaded ends instead of flanged ends.
 - 2. Iron Swing Check Valves: Class 125, nonmetallic-to-metal seats.
 - 3. Iron Gate Valves: Class 125 OS&Y.
 - 4. Iron Globe Valves: Class 125.

3.5 SANITARY-WASTE AND STORM-DRAINAGE VALVE SCHEDULE

- A. Pipe NPS 2 (DN 50) and Smaller:
- 1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Ball Valves: Two piece, full port, brass or bronze with brass trim.
 - 3. Bronze Swing Check Valves: Class 125, bronze disc.
 - 4. Bronze Gate Valves: Class 125, NRS.

- B. Pipe NPS 2-1/2 (DN 65) and Larger:
1. Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to NPS 100): May be provided with threaded ends instead of flanged ends.
 2. Iron Swing Check Valves: Class 125, nonmetallic-to-metal seats.
 3. Iron Gate Valves: Class 125, OS&Y.

END OF SECTION

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Thermal-hanger shield inserts.
 - 4. Pipe positioning systems.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7
 - 1. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 - 3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:
 - 1. Trapeze pipe hangers.
 - 2. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Copper Pipe Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
 - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 THERMAL-HANGER SHIELD INSERTS

- A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig (688-kPa), ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.4 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.5 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

- G. Install lateral bracing with pipe hangers and supports to prevent swaying.
- H. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- I. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- J. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
 - b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
 - c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
 - d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.
 - e. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.
 - 5. Pipes NPS 8 (DN 200) and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
 - 6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.3 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099113 "Exterior Painting." And Section 099123 "Interior Painting."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.5 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

- E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.
- F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F (566 deg C), pipes NPS 4 to NPS 24 (DN 100 to DN 600), requiring up to 4 inches (100 mm) of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
 - 4. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
 - 5. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
 - 6. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36 (DN 100 to DN 900), with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 - 7. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36 (DN 100 to DN 900), with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 - 8. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30 (DN 25 to DN 750), from two rods if longitudinal movement caused by expansion and contraction might occur.
 - 9. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 (DN 50 to DN 1050) if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.
- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.

2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
 2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 4. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 5. C-Clamps (MSS Type 23): For structural shapes.
 6. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb (340 kg).
 - b. Medium (MSS Type 32): 1500 lb (680 kg).
 - c. Heavy (MSS Type 33): 3000 lb (1360 kg).
 7. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 8. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
 2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
 3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
- O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- P. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.
- Q. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Tags.
- B. Pipe markers.

1.2 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems 2020.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Piping: Pipe markers.
- B. Valves: Tags.

2.2 TAGS

- A. Manufacturers:
 - 1. Advanced Graphic Engraving: www.advancedgraphicengraving.com/#sle.
 - 2. Brady Corporation: www.bradycorp.com/#sle.
 - 3. Brimar Industries, Inc: www.pipemarket.com/#sle.
 - 4. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
 - 5. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - 6. Seton Identification Products: www.seton.com/#sle.
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch (40 mm) diameter with smooth edges.

2.3 PIPE MARKERS

- A. Manufacturers:
 - 1. Brady Corporation: www.bradycorp.com/#sle.
 - 2. Brimar Industries, Inc: www.pipemarket.com/#sle.
 - 3. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
 - 4. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - 5. Seton Identification Products: www.seton.com/#sle.
- B. Comply with ASME A13.1.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- E. Color code as follows:
 - 1. Potable, Cooling, Boiler, Feed, Other Water: Green with white letters.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

- A. Install tags with corrosion resistant chain.
- B. Install plastic pipe markers in accordance with manufacturer's instructions.
- C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- D. Use tags on piping 3/4 inch (20 mm) diameter and smaller.
 - 1. Identify service, flow direction, and pressure.
 - 2. Install in clear view and align with axis of piping.
 - 3. Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 22 07 19

PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping insulation.
- B. Jackets and accessories.

1.2 REFERENCE STANDARDS

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2021a.
- C. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.
- D. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation 2017.
- E. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2022a.
- F. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation 2017, with Editorial Revision (2022).
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2022a.
- I. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or ASTM E84.

2.2 GLASS FIBER

- A. Manufacturers:
 - 1. CertainTeed Corporation: www.certainteed.com.
 - 2. Johns Manville Corporation: www.jm.com.
 - 3. Knauf Insulation: www.knaufusa.com.
 - 4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
 - 1. K (Ksi) Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
 - 2. Maximum Service Temperature: 850 degrees F (454 degrees C).
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches (0.029 ng/Pa s m).

2.3 JACKETS

- A. PVC Plastic.
 - 1. Manufacturers:
 - a. Johns Manville Corporation: www.jm.com.
 - 2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Minimum Service Temperature: 0 degrees F (Minus 18 degrees C).
 - b. Maximum Service Temperature: 150 degrees F (66 degrees C).
 - c. Moisture Vapor Permeability: 0.002 perm inch (0.0029 ng/Pa s m), maximum, when tested in accordance with ASTM E96/E96M.
 - d. Thickness: 10 mil (0.25 mm).
 - e. Connections: Brush on welding adhesive.

- B. ABS Plastic:
 - 1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
 - b. Maximum Service Temperature: 180 degrees F (82 degrees C).
 - c. Moisture Vapor Permeability: 0.012 perm inch (0.018 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
 - d. Thickness: 30 mil (0.76 mm).
 - e. Connections: Brush on welding adhesive.

- C. Aluminum Jacket: ASTM B209 (ASTM B209M) formed aluminum sheet.
 - 1. Thickness: 0.016 inch (0.40 mm) sheet.
 - 2. Finish: Smooth.
 - 3. Joining: Longitudinal slip joints and 2 inch (50 mm) laps.
 - 4. Fittings: 0.016 inch (0.4 mm) thick die shaped fitting covers with factory attached protective liner.
 - 5. Metal Jacket Bands: 3/8 inch (10 mm) wide; 0.015 inch (0.38 mm) thick aluminum.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Install insulation on piping accessories requiring future re-occurring access and service with factory fabricated insulation covers that are easily removed and reapplied
- F. Glass fiber insulated pipes conveying fluids below ambient temperature:
 - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
 - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

- G. Glass fiber insulated pipes conveying fluids above ambient temperature:
1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- H. Inserts and Shields:
1. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 2. Insert Location: Between support shield and piping and under the finish jacket.
 3. Insert Configuration: Minimum 6 inches (150 mm) long, of same thickness and contour as adjoining insulation; may be factory fabricated.
- I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 078400.
- J. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.
- K. Buried Piping: Provide factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with one mil (0.025 mm) thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with a polyester film.

END OF SECTION

SECTION 22 10 05
PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Domestic water piping, buried within 5 feet of building.
- B. Domestic water piping, above grade.
- C. Storm drainage piping, buried within 5 feet of building.
- D. Sanitary sewer and vent.
- E. Pipe flanges, unions, and couplings.
- F. Pipe hangers and supports.
- G. Ball valves.
- H. Balancing valves.
- I. Pressure relief valves.
 - 1. Control and service valves.
- J. Strainers.

1.2 REFERENCE STANDARDS

- A. ANSI Z21.22 - American National Standard for Relief Valves for Hot Water Supply Systems 2015 (Reaffirmed 2020).
- B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2021.
- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2021.
- E. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings: DWV 2021.
- F. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings—DWV 2017.
- G. ASME B31.9 - Building Services Piping 2020.
- H. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators 2021.
- I. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2022).

- J. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings 2021.
- K. ASTM B32 - Standard Specification for Solder Metal 2020.
- L. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes 2020.
- M. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2022.
- N. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) 2020.
- O. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube 2016.
- P. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings 2016.
- Q. ASTM C425 - Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings 2022.
- R. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings 2020a.
- S. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 2021a.
- T. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings 2022.
- U. ASTM D2239 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter 2022.
- V. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems 2020.
- W. ASTM D2661 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings 2021.
- X. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings 2020.
- Y. ASTM D2680 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping 2020.
- Z. ASTM F628 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core 2022.
- AA. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).
- BB. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding 2019.
- CC. AWWA C550 - Protective Interior Coatings for Valves and Hydrants 2017.
- DD. AWWA C606 - Grooved and Shouldered Joints 2015.

- EE. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2021.
- FF. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2020.
- GG. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).
- HH. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010, with Errata .
- II. NSF 61 - Drinking Water System Components - Health Effects 2022, with Errata.
- JJ. NSF 372 - Drinking Water System Components - Lead Content 2022.
- KK. ASME - Boiler and Pressure Vessel Code
- LL. AGA - American Gas Association Code

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- C. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Valve Repacking Kits: One for each type and size of valve.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with State of California, standards.
 - 1. Maintain one copy on project site.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.
- C. Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.
- D. Welder Qualifications: Certified in accordance with ASME BPVC-IX. Qualify procedures and operators in accordance with ASME Boiler and Pressure Vessel Code.
- E. Piping materials shall bear label, stamp, or other markings fo specified testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.

- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- E. Protect and store PE pipes and valves from direct sunlight.
- F. Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations. Replace all damaged or defective items.

1.6 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.
- B. Interruption of Existing Utility Service: Do not interrupt service to facilities occupied by owner or others unless permitted under the following conditions and then only after arranging to provide temporary service in accordance with requirements indicated:
 - 1. Notify Construction Manager no fewer than two days in advance of proposed interruption of sanitary waste service.
 - 2. Do not proceed with interruption of sanitary waste service without Construction Manager's written permission.
- C. Become familiar with details of the scope of work, verify dimensions in the field, and advise the Architect / Engineer of any discrepancy prior to performing any work.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 14, NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Sanitary Waste and Vent Systems: Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "FSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

2.2 SANITARY SEWER AND VENT PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. ABS Pipe: ASTM F628, Schedule 40.
 - 1. ABS Fittings: ASTM D 2661, made to ASTM D 3311, drain, waste and vent patterns.
 - 2. Joints: Solvent welded with ASTM D2235 cement.
 - a. Solvent cement shall have a VOC content of 325 g/L or less.
 - b. Solvent cement shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. PVC Schedule 40 DWV Pipe per ASTM D1785 and ASTM D 2665
 - 1. Fittings: PVC DWV per ASTM D 2665
 - 2. Joints: Solvent cement weld per ASTM F 656 and solvent cement per ASTM D2564
 - a. Solvent cement shall have a VOC content of 510 g/L or less.
 - b. Adhesive primer shall have a VOC content of 550 g/L or less.

- c. Adhesive primer shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 SANITARY SEWER AND VENT PIPING, ABOVE GRADE

- A. Cast Iron Pipe: ASTM A888, CISPI 301, hubless, service weight.
 - 1. Fittings: Cast iron, ASTM A888 or CISPI 301.
 - 2. Sovent Stack fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aearator and deaerator drainage fittings.
 - 3. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.
 - 4. CISPI, Hubless-Piping Couplings:
 - a. Standards: ASTM C 1277 and CISPI 310.
 - b. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices: and ASTM C 564, rubber sleeve with integral, center pipe stop.
 - 5. Cast-Iron, Hubless-Piping Couplings:
 - a. Standards: ASTM C 1277 and ASTM C 1540.
 - b. Description: Stanless-steel shield with stainless-steel bands and tightening devices: and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Copper Pipe: Class 150 bronze unions with brazed joints below grade, hard drawn.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
 - 2. Copper Unions:
 - a. MSS SP-123
 - b. Cast-copper-alloy, hexagonal-stock body.
 - c. Ball-and-socket, metal -to-metal seating surfaces.
 - d. Solder-joint or threaded ends.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, alloy Sn95 solder.
 - 3. Mechanical Press Sealed Fittings: Double-pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, nontoxic, synthetic rubber sealing elements.
 - a. Manufacturers:
 - 1) Anvil International: www.anvilintl.com/#sle.
 - 2) Apollo Valves: www.apollovalves.com/#sle.
 - 3) Grinnell Products: www.grinnell.com/#sle.
 - 4) Viega LLC: www.viega.us/#sle.

2.6 STORM DRAINAGE PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. ABS Pipe: ASTM D2680.
 - 1. NSF Marking: Comply with NSF 14, "Plastics Piping System Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic storm drain and "NSF-sewer" for plastic storm serwer piping.
 - 2. Solid-Wall ABS Pipe: ASTM D2661, Schedule 40.
 - 3. Cellular-Core ABS Pipe: ASTM F628, Schedule 40.
 - 4. Fittings: ABS ASTM D2661, made to ASTM D3311, drain, waste, and vent patterns.

5. Joints: Solvent welded with ASTM D2235 cement.
 - a. Solvent cement shall have a VOC content of 325 g/L or less.
 - b. Solvent cement shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.7 STORM DRAINAGE PIPING, ABOVE GRADE

- A. Hubless Cast Iron Pipe: ASTM A74 extra heavy weight.
 1. Fittings: Cast iron ASTM C1277
 2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.
 3. Minimum working pressure: 10-ft head of water.
 4. Minimum Working Pressure on Forced-Main Piping: 50 psig.
 5. Description: Stainless steel corrugated shield with stainless steel bands and tightening devices: and ASTM C564, rubber sleeve with integral, center pipe stop.

2.8 PIPE FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 3 inch and Under:
 1. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
- B. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
 1. Dimensions and Testing: In accordance with AWWA C606.
 2. Housing Material: Provide ASTM A47/A47M malleable iron or ductile iron, galvanized.
 3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
 4. When pipe is field grooved, provide coupling manufacturer's grooving tools.
- C. No-Hub Couplings:
 1. Testing: In accordance with ASTM C1277 and CISPI 310.
 2. Gasket Material: Neoprene complying with ASTM C564.
 3. Band Material: Stainless steel.
 4. Eyelet Material: Stainless steel.
- D. Grooved and Shouldered Pipe End Couplings:
 1. Housing: Malleable iron clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; steel bolts, nuts, and washers; galvanized for galvanized pipe.
 2. Sealing gasket: "C" shape composition sealing gasket.

2.9 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
 3. Trapeze Hangers: Welded steel channel frames attached to structure.
 4. Vertical Pipe Support: Steel riser clamp.
- B. Plumbing Piping - Drain, Waste, and Vent:
 1. Conform to ASME B31.9.
 2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.

3. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
- C. Plumbing Piping - Water:
1. Conform to ASME B31.9.
 2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 3. Hangers for Cold Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 4. Hangers for Hot Pipe Sizes 2 to 4 inch: Carbon steel, adjustable, clevis.

2.10 BALL VALVES

- A. Manufacturers:
1. Tyco Flow Control: www.tycoflowcontrol.com.
 2. Apollo Valves: www.apollovalves.com.
 3. Nibco, Inc: www.nibco.com/#sle.
 4. Uponor, Inc: www.uponorengineering.com/#sle.
 5. Viega LLC: www.viega.us/#sle.
 6. Stockham: www.stockham.com
- B. Construction, 4 inch and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.
- C. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze, two piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder end with union.

2.11 SPRING LOADED CHECK VALVES

- A. Manufacturers:
1. Apollo Valve: www.apollovalves.com.

2.12 PRESSURE RELIEF VALVES

- A. Manufacturers:
1. Cla-Val Co: www.cla-val.com/#sle.
 2. Watts Regulator Company: www.wattsregulator.com/#sle.
- B. ANSI Z21.22, AGA certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.

2.13 CONTROL AND SERVICE VALVES

- A. Flow Control Valves:
1. Manufacturers:
 - a. Singer, a Mueller brand: www.singervalve.com/#sle.
 2. Size: 1/2 to 40 inch, Class 150 flange ends.
 3. AWWA C550 compliant cast iron globe valve, elastomeric diaphragm, seat disc and epoxy coated both internally and externally.
 4. Differential Pressure Based Rate-of-Flow Pilot-Operator:
 - a. Operating Range: 25 to 50 psi.
 - b. Connected into brass, bronze, or copper pilot piping and fittings.
 - c. Precision fixed-flow restrictor, strainer, pressure gauges, and isolation valves.

2.14 STRAINERS

- A. Manufacturers:
 - 1. Armstrong International, Inc: www.armstronginternational.com/#sle.
 - 2. Green Country Filter Manufacturing: www.greencountryfilter.com/#sle.
 - 3. Jomar Valves, a division of Jomar Group: www.jomarvalve.com/#sle.

- B. Size 2 inch and Smaller:
 - 1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
 - 2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.

- C. Size 2-1/2 inch to 4 inch:
 - 1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Shut-off valves shall be provided on all main branches, runs to risers and where shown on drawings. Locate shut-off valves over T-Bar Ceiling when possible. Provide access panesl when shut-off valves are located over hard lid ceilings.
- H. Provide access where valves and fittings are not exposed.
- I. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Color to be specified by architect.

- J. Exposed, unfinished pipe, fittings, supports, and accessories shall be painted.
- K. Exterior piping, fittings, supports and accessories shall have approved UV protection
- L. Install valves with stems upright or horizontal, not inverted. See Section 220523.
- M. Provide stem extension on all valves for piping requiring insulation to ensure valve can be cycled without damaging pipe insulation.
- N. Install water piping to ASME B31.9.
- O. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
- P. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.9.
 - 2. Support horizontal piping as indicated.
 - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 4. Place hangers within 12 inches of each horizontal elbow.
 - 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

3.4 APPLICATION

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- D. Install globe valves for throttling, bypass, or manual flow control services.
- E. Provide spring-loaded check valves on discharge of water pumps.
- F. Provide flow controls in water recirculating systems where indicated.

3.5 FIELD TESTS AND INSPECTIONS

- A. Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.
- B. Domestic Water Systems:
 - 1. Perform hydrostatic testing for leakage prior to system disinfection.
 - 2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
 - 3. General:
 - a. Fill the system with water and raise static head to 10 psi above service pressure. Minimum static head of 50 to 150 psi. As an exception, certain codes allow a maximum static pressure of 80 psi.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Disinfect water distribution system in accordance with local jurisdiction. Potable water systems shall be disinfected and flushed prior to use by water-chlorination solution and have

bacteriological examination made by an approved agency per 2019 California Plumbing Code section 609.9 and as prescribed in AWWA C651. Methods of cleaning / disinfecting for new or repair piping as described in C651 or NFPA 24.

- B. Prior to starting work, verify system is complete, flushed, and clean.

3.7 INSTALLATION OF FLOW CONTROL VALVES

- A. Install automatic flow control valve in each hot water recirculating loop, and elsewhere as indicated. Install a shutoff valve and strainer upstream and a union, check valve and shutoff valve downstream of each automatic flow control valve.
- B. Set flow control valve flow rate as follows:
 - 1. Preliminary Procedures For Hot Water Return System Balancing:
 - a. Before operating the system perform these steps:
 - 1) Open Valves at recirculation pump and flow control valves to full open position.
 - 2) Remove and clean all strainers.
 - 3) Check recirculation pump rotation.
 - 4) Set water heater temperature as indicated on the drawings.
 - 2. Procedures For Hot Water Return System Balancing:
 - a. Refer to the drawings for required flow rate for each flow control valve.
 - b. Provide required instrumentation to obtain proper measurements. Instruments shall be properly maintained and protected against damage.
 - c. Apply instrument as recommended by the manufacturer.
 - d. Take readings with the eye at the level of the indicated valve to prevent parallax.
 - e. Mark flow control valve setting with memory stop. Mark with paint or other suitable, permanent identification materials.
 - f. Retest, adjust, and balance systems subsequent to significant systems modifications, and resubmit test results.
- C. Reports: Prepare hot water return system balancing reports signed and submit to the architect upon completion of the project. Include the following information:
 - 1. Valve tag number and description of location
 - 2. Valve body size
 - 3. Differential pressure reading from instrument in psi
 - 4. Actual flow rate derived from the manufacturer's charts and tablets for the valve size and measured differential pressure.

END OF SECTION

SECTION 22 10 06

PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Drains.
- B. Cleanouts.
- C. Hose bibbs.
- D. Washing machine boxes and valves.
- E. Water hammer arrestors.
- F. Trap Primer
- G. Mixing valves.

1.2 REFERENCE STANDARDS

- A. ASME A112.6.3 - Floor and Trench Drains 2019.
- B. ASME A112.6.4 - Roof, Deck, and Balcony Drains 2022.
- C. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers 2017.
- D. ASSE 1012 - Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent 2021.
- E. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies 2021.
- F. ASSE 1019 - Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance 2011 (Reaffirmed 2016).
- G. NSF 61 - Drinking Water System Components - Health Effects 2022, with Errata.
- H. NSF 372 - Drinking Water System Components - Lead Content 2022.
- I. PDI-WH 201 - Water Hammer Arresters 2017.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C. Certificates: Certify that grease interceptors meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.
- B. Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations. Replace all damaged or defective items.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.2 DRAINS

- A. Manufacturers:
 - 1. Josam Company: www.josam.com.
 - 2. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
 - 3. Zurn Industries, LLC: www.zurn.com.
 - 4. Mifab: www.mifab.com
- B. Drain Assemblies
 - 1. Sanitary drains shall bear label, stamp, or other markings of specified testing agency.
- C. Roof Drains:
 - 1. Standard: ASME A112.6.4.
 - 2. Description: Coated cast-iron roof drain, non-puncturing clamp ring with integral gravel stop, and sump with wide roof flange.
 - 3. Body: Lacquered cast iron with sump.
 - 4. Strainer: Removable polyethylene locking dome.
 - 5. Outlet: Bottom no-hub, refer to drawings for size.
- D. Overflow Drains:
 - 1. Standard: ASME A112.6.4.
 - 2. Description: Coated cast-iron roof drain, non-puncturing clamp ring with integral gravel stop, sump with wide roof flange.
 - 3. Body: Lacquered cast iron with sump.
 - 4. Strainer: Removable polyethylene locking dome.
 - 5. Outlet: Bottom no-hub, refer to drawings for size.
 - 6. Collar: 2 inch high solid clamping collar
- E. Downspout Nozzles:
 - 1. Description: Cast bronze downspout nozzle, loose wall flange and inlet threaded connection.
 - 2. Body Material: Cast bronze
 - 3. Connection Type: No-hub spigot outlet
 - 4. Pipe Size: Refer to drawings.

- F. Floor Drain:
 1. Standard: ASME A112.6.3.
 2. Description: Lacquered cast iron two piece body with double drainage flange, invertible non-puncturing flashing collar with weep holes and threaded to receive adjustable strainer.
 3. Body: Lacquered cast iron with sump.
 4. Outlet: Bottom no-hub outlet, refer to plans for size.
 5. Trap primer connection: 1/2 inch.
 6. Strainer: Round adjustable nickel-bronze.

2.3 CLEANOUTS

- A. Cast-Iron Cleanout
 1. Manufacturers:
 - a. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
 - b. Josam Company: www.josam.com.
 - c. Zurn Industries, LLC: www.zurn.com.
 - d. Mifab: www.mifab.com
 2. Standard: ASME A 112.36.2M.
 3. Size: Same as connected drainage piping
 4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping
 5. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
 6. Frame and Cover: Round, stainless steel
- B. Cleanouts at Interior Finished Floor Areas:
 1. Galvanized cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.
- C. Cleanouts at Interior Finished Wall Areas:
 1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

2.4 HOSE BIBBS

- A. Manufacturers:
 1. Woodford: www.woodfordmfg.com.
 2. Zurn Industries, LLC: www.zurn.com.
 3. Mifab: www.mifab.com
- B. Exposed Hose Bibbs:
 1. Standard: ASME A112.18.1.
 2. Description: Wall mounted hose bibb with integral mounting flange, chrome plated with metal handwheel, and operating tee key.
 3. Body Material: Bronze with chrome finish
 4. Supply Connections: 3/4 inch.
 5. Vacuum Breaker: Integral, non-removable, hose-connection vacuum breaker complying with ASSE 1011.
- C. Recessed Hose Bibbs:
 1. Standard: ASME A112.18.1.
 2. Description: Wall mounted hose bibb with lockable recessed box, chrome plated with metal hand wheel and operating tee key.
 3. Body Material: Bronze with chrome finish

4. Supply Connections: 3/4 inch.
5. Vacuum Breaker: Integral, non-removeable, hose-connection vacuum breaker complying with ASSE 1011.
6. Recessed Box: Brass or chrome lockable box.

2.5 WASHING MACHINE BOXES AND VALVES

- A. Manufacturers:
 1. IPS Corporation/Water-Tite: www.ipscorp.com.
 2. Oatey Supply Chain Services, Inc: www.oatey.com.
 3. Viega LLC: www.viega.us.
- B. Washing Machine Box:
 1. Mounting: Recessed
 2. Material and Finish: PVC box and faceplate.
 3. Faucet: Separate hot water and cold water valved fittings complying with ASME A112.18.1. Include garden-hose thread complying with ASME B1.20.7 on outlets. Provide water hammer arrestors on all supply connections.
 4. Supply Shutoff Fittings: 1/2 inch quarter turn ball valves and 1/2 inch copper waer tubing.
 5. Drain: 2 inch standpipe and P-trap for direct waste connection to drainage piping.

2.6 WATER HAMMER ARRESTORS

- A. Manufacturers:
 1. Precision Plumbing Products: www.pppinc.com.
 2. Watts Regulator Company, a part of Watts Water Technologies: www.wattsregulator.com.
 3. Mifab: www.mifab.com
- B. Water Hammer Arrestors:
 1. Standard: ASSE 1010
 2. Type: Copper tube with piston.
 3. Temperature Range: 33 degrees F to 200 degrees F
 4. Systems exceeding 80 PSI shall have a pressure reducing valve installed upstream of the water hammer arrestor units.
 5. All concealed water hammer arrestoers shall be accessible by means of access door or removable panel.
 6. Vertical caped pipe columns will not be permiteted.

2.7 Trap primers

- A. Manufacturers:
 1. Precision Plumbing Products: www.pppinc.com.
 2. Watts Regulator Company, a part of Watts Water Technologies: www.wattsregulator.com.
 3. Mifab: www.mifab.com
- B. Pressure Drop Trap Primer
 1. Description: Fully automatic, no adjustment required, activates on 3 PSI pressure differential.
 2. Standard: ASSE 1018.
 3. Pressure Rating: 125 psig minimum.
 4. Body: Bronze.

5. Cabinet: All concealed trap primers shall be accessible by means of access door or removable panel. Recessed-mounted steel box with stainless-steel cover.
6. Inlet and Outlet Connection: 1/2 inch threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

C. Electronic Trap Primer

1. Description: Electronic Trap Primer floor drain trap priming device consisting of a solenoid valve, bronze air gap fitting, 3-prong cord, and timer factory set to discharge once every 24 hour period. Add EMS to interface with the facility's energy management system as required. Conforms to UL and CSA Standards. Installed to manufacturer's recommendations.
2. Standard: ASSE 1044.
3. Cabinet: All concealed trap primers shall be accessible by means of access door or removable panel. Recessed -mounted steel box with stainless-steel cover.
4. Inlet and Outlet size: 1/2 inch threaded or solder joint.

2.8 MIXING VALVES

A. Thermostatic Mixing Valves:

1. Manufacturers:
 - a. Cash Acme, a brand of Reliance Worldwide Corporation: www.cashacme.com.
 - b. POWERS, a WATTS brand: www.watts.com/our-story/brands/powers.
 - c. Symmons Industrie, Inc.: www.symmons.com.
 - d. Leonard Valve Company: www.leonardvalve.com.
 - e. Bradley Corporation: www.bradlycorp.com.
2. Construction:
 - a. Standard: ASSE 1017
 - b. Pressure Rating: 125 psig.
 - c. Type: Therostatically controlled, water mixing valve.
 - d. Material: Bronze body with corrosion-resistant interior compnents.
 - e. Connectons: Threade inlets and outlet.
 - f. Accessories: Check stops on hot-and cold water supplies, and adjustable, temperature control handle.
 - g. Tempered-Water Setting: 110 deg F unless stated otherwise on plans.
 - h. Inlet / Outlet Connections: Refer to plans for sizes, provide ball valves.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for prodding of drainage system.
- C. Install floor cleanouts at elevation to accommodate finished floor.
- D. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.
- E. Pipe relief from backflow preventer to nearest drain.

- F. Install water hammer arrestors complete with accessible isolation valve on supply piping.

END OF SECTION

SECTION 22 40 00
PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush valve water closets.
- B. Wall hung urinals.
- C. Lavatories.
- D. Sinks.
- E. Under-lavatory pipe supply covers.
- F. Bi-level, electric water coolers.
- G. Service sinks.

1.2 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ANSI Z124.2 - American National Standard for Plastic Shower Units; 1995.
- C. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration 2008 (Reaffirmed 2013).
- D. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use 1997 (Reaffirmed 2017).
- E. ASME A112.18.1 - Plumbing Supply Fittings 2018, with Errata.
- F. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures 2011 (Reaffirmed 2022).
- G. ASME A112.19.1M - Enameled Cast Iron Plumbing Fixtures; The American Society of Mechanical Engineers; 2008 (R2011).
- H. ASME A112.19.2 - Ceramic Plumbing Fixtures 2018, with Errata.
- I. ASME A112.19.3 - Stainless Steel Plumbing Fixtures 2022.
- J. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks 2022.
- K. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices 2020.
- L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- M. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

N. NSF 61 - Drinking Water System Components - Health Effects 2022, with Errata.

O. NSF 372 - Drinking Water System Components - Lead Content 2022.

1.3 SUBMITTALS

A. Product Data: Provide catalog illustrations of fixtures, sizes, flow rate, rough-in dimensions, utility sizes, trim, and finishes.

B. Maintenance Data: Include fixture trim exploded view and replacement parts lists.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Service Support: The equipment shall be supported by service organizations. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage. Replace any damaged or defective items.

B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

B. Water Efficiency: EPA WaterSense label is required for all water closets, urinals, lavatory faucets, and showerheads.

2.2 FLUSH VALVE WATER CLOSETS

A. Water Closets: Vitreous China, ASME A112.19.2, floor mounted, siphon jet flush action, china bolt caps.

1. Bowl: ASME A112.19.2; 16.5 inches high for ADA compliant water closet, and 15 inches high for standard height water close, and with elongated rim.

2. Flush Volume: 1.28 gallon per flush, maximum.

3. Flush Valve: Exposed (top spud).

4. Flush Operation: Manual, oscillating handle

5. Handle height: 44 inches or less. Mounted height of flush valve shall not interfere with the handrail in the wheelchair accessible stalls.

6. Color: White.

7. Operating Pressure: Minimum 35 psi

8. Provide: Wax bowl ring including plastic sleeve.

9. Water closet must be Water Sense certified.

10. Manufacturers:
 - a. American Standard Inc: www.americanstandard.com
 - b. Sloan Valve Company: www.sloanvalve.com.
 - c. Kohler Company: www.kohler.com.
 - d. Toto USA: www.totousa.com

- B. Flush Valves:
 1. Manufacturers:
 - a. American Standard, Inc: www.americanstandard-us.com.
 - b. Sloan Valve Company: www.sloanvalve.com.
 - c. Zurn Industries, Inc: www.zurn.com.
 2. Manual Operated:
 - a. Type: ASME A112.18.1 or ASME A112.19.5; diaphragm type complete with vacuum breaker stops, cover, tailpiece, and accessories.
 - b. Supplied Volume Capacity: 1.28 gal/flush.
 - c. Finish: Polished Chrome

- C. Toilet Seats:
 1. Manufacturers:
 - a. American Standard, Inc: www.americanstandard-us.com.
 - b. Bemis Manufacturing Company: www.bemismfg.com.
 - c. Church Seat Company: www.churchseats.com.
 - d. Olsonite: www.olsonite.com.
 - e. Substitutions: See Section 016000 - Product Requirements.
 2. Standard: IAPMO/ANSI Z124.5.
 3. Material: Solid plastic, antimicrobial.
 4. Type: Commercial with extended back.
 5. Shape: Elongated rim, open front.
 6. Hinge: Self-sustaining hinge.
 7. Hinge Material: Noncorroding metal.
 8. Seat Cover: Not required.
 9. Color: White.

2.3 WALL HUNG URINALS

- A. Manufacturers:
 1. American Standard, Inc: www.americanstandard-us.com.
 2. Kohler Company: www.kohler.com.
 3. Toto: www.totousa.com.

- B. Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier.
 1. Consumption Volume: 0.125 gal per flush, maximum.
 2. Flush Style: Washout.
 3. Flush Valve: Exposed (top spud).
 4. Flush Operation: Manual, oscillating handle.
 5. Trapway Outlet: Integral.
 6. Removable stainless steel strainer.

- C. Flush Valves:

- D. Manufacturers:
 1. American Standard, Inc: www.americanstandard-us.com.
 2. Sloan Valve Company: www.sloanvalve.com.
 3. Zurn Industries, Inc: www.zurn.com.
 4. Manual Operated:

- a. Type: ASME A112.18.1 or ASME A112.19.5; diaphragm type, complete with vacuum breaker stops, oscillating handle, and accessories.
- b. Supplied Volume Capacity: 0.125 gal per flush.

E. Urinal Carriers:

- 1. Manufacturers:
 - a. Jay R. Smith MFG. Co: www.jrsmith.com.
 - b. JOSAM Company: www.josam.com.
 - c. Zurn Industries, LLC: www.zurn.com.
- 2. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

2.4 LAVATORIES

A. Manufacturers:

- 1. American Standard Inc.: www.americanstandard.com
- 2. Kohler Company: www.kohler.com

B. Wall-Hung Basin:

- 1. Vitreous China, Grade A: ASME A112.19.2; white, rectangular commercial-grade sink with predrilled holes, rear-center drain, front overflow, and hanger. Size as indicated on drawings with 4-inch centerset spacing.
- 2. Carrier:
 - a. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, bearing plate and studs.
 - b. Manufacturers:
 - 1) Jay R. Smith MFG. Co: www.jrsmith.com.
 - 2) JOSAM Company: www.josam.com.
 - 3) Zurn Industries, LLC: www.zurn.com.

C. Supply Faucet Manufacturers:

- 1. Chicago Faucets, a Geberit company: www.chicagofaucets.com.
- 2. Kohler Company: www.kohler.com.
- 3. Sloan: www.sloan.com

D. Metered Faucet:

- 1. ASME A112.18.1 chrome plated metered mixing faucet with self-closing, auto-timed metering cartridge, adjustable run time from 2 to 15 seconds, opens with push, 0.20 max gallons per cycle, and cover plate, open grid strainer.
- 2. Spout Style: Standard.
- 3. Mixing Valve: None, single line for tempered water.
- 4. Water Supply: 3/8 inch compression connections.
- 5. Aerator: Vandal resistant, 0.5 gpm, non-aerating spray.

E. Accessories:

- 1. Offset waste with perforated open strainer.
- 2. Wheel handle stops.
- 3. Rigid supplies.

2.5 UNDER-LAVATORY PIPE SUPPLY COVERS

A. Manufacturers:

- 1. Plumberex Specialty Products, Inc: www.plumberex.com.
- 2. Truebro: www.truebro.com
- 3. Substitutions: See Section 016000 - Product Requirements.

- B. General:
1. Insulate exposed drainage piping including hot, cold and tempered water supplies under lavatories or sinks per accessibility Standards.
 2. Construction: 1/8 inch PVC with antimicrobial, antifungal and UV resistant properties.
 - a. Comply with ASME A112.18.9 for covers on accessible lavatory piping.
 - b. Comply with ICC A117.1.
 3. Color: High gloss white.
 4. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces. No cable ties allowed.

2.6 BI-LEVEL, ELECTRIC WATER COOLERS

- A. Manufacturers:
1. Haws Corporation: www.hawesco.com/#sle.
 2. Murdock Manufacturing, Inc: www.murdockmfg.com/#sle.
 3. Oasis International: www.oasiscoolers.com/#sle.
- B. Water Cooler: Bi-level, electric, mechanically refrigerated; surface mounted, accessible compliant; stainless steel top, vinyl on steel body, elevated anti-squirt bubbler with stream guard, automatic stream regulator, push button, mounting bracket; integral air cooled condenser and stainless steel grille.
1. Capacity: 8 gph of 50 degrees F water with inlet at 80 degrees F and room temperature of 90 degrees F, when tested in accordance with ASHRAE Std 18.
 2. Electrical: 115 VAC, 60 Hertz compressor, 6 foot cord and plug for connection to electric wiring system including grounding connector.

2.7 SERVICE SINKS

- A. Manufacturers:
1. American Standard, Inc: www.americanstandard-us.com.
 2. Elkay Manufacturing Company: www.elkay.com.
 3. Just Manufacturing Company: www.justmfg.com.
- B. Bowl: White enameled cast iron, floor mounted, with vinyl bumper guard, stainless steel strainer.
- C. Trim: ASME A112.18.1 exposed wall type supply with cross handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges.
- D. Accessories:
1. Hose clamp hanger.
 2. Mop hanger.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with loose key or integral stops, reducers, and escutcheons.
- C. Install components level and plumb.
- D. Install and secure fixtures in place with wall supports and bolts.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

3.5 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

- A. Clean plumbing fixtures and equipment.

3.7 PROTECTION

- A. Protect installed products from damage due to subsequent construction operations.
- B. Do not permit use of fixtures by construction personnel.
- C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 23 00 10

BASIC MECHANICAL REQUIREMENTS

PART 1. GENERAL

1.1 SECTION INCLUDES

- A. Basic Mechanical Requirements specifically applicable to Division 23 Sections, in addition to Division 01 - General Requirements.

1.2 DESCRIPTION

- A. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as required to complete the work of this section, except as otherwise herein specifically excluded.

1.3 WORK INCLUDED

- A. The complete Heating, Ventilating and Air Conditioning (HVAC) systems, including but not limited to these major items.
 1. Coordinate work of this Section with related trades.
 2. Verify applicable dimensions and locations of existing utilities, fans, and thermostats at the jobsite.
 3. Duct systems; supply, return and exhaust complete with manual dampers.
 4. Diffusers and registers.
 5. Exhaust fans..
 6. Furnishing and installation of miscellaneous hangers, supports, sleeves, inserts, anchors and other auxiliary equipment for systems under this Division.
 7. Duct lining and insulation.
 8. Shop drawings.
 9. Equipment identification.
 10. Equipment and systems adjustments and balancing.
 11. Air testing, adjusting and balancing.
 12. Written operating and maintenance instructions.
 13. Record drawings.
 14. Guarantee

1.4 WORK SPECIFIED ELSEWHERE

- A. Concrete, Rough Carpentry, Joint Sealants, Sheet Metal, Flashing and Trim, Access Door and Frames, Acoustical Ceiling Tile, Door Hardware, Paints and Coatings, Plumbing and Electrical.

1.5 SITE INSPECTION

- A. Contractor shall familiarize himself with the conditions at the site. No allowance will be made subsequently for any error through negligence in observing the site conditions. Contractor shall observe and make cost allowance for any mechanical and/or electrical items that must be relocated to accommodate the installation or servicing of any item covered under this contract.

1.6 ORDINANCES, REGULATIONS AND CODES

- A. References to Technical Societies, Trade Organizations, Governmental Agencies is made in Division 15 in accordance with the following abbreviations.
 1. AFI - Air Filter Institute
 2. AMCA - Air Moving & Conditioning Association
 3. ARI - Air Conditioning & Refrigeration Institute

4. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
5. ASME - American Society of Mechanical Engineers
6. ASTM - American Society of Testing Materials
7. AWS - American Welding Society Code
8. ANSI - American National Standards Institute
9. CBC - California Building Code
10. CCR - California Code of Regulations
11. CEC - California Electrical Code
12. CFC - California Fire Codes
13. CMC - California Mechanical Code
14. CPC - California Plumbing Code
15. FIA - Factory Insurance Association
16. NAFM - National Association of Fan Manufacturers
17. NEMA - National Electrical Manufacturer's Association
18. NFPA - National Fire Protection Association
19. ORS - Office of Regulatory Services
20. SCAQMD - South Coast Air Quality Management District
21. SMACNA - Sheet Metal and Air Conditioning Contractors National Association
22. UFC - Uniform Fire Code
23. UL - Underwriter's Laboratories
24. UPC - Uniform Plumbing Code

B. Requirements of Regulatory Agencies: Materials and installation shall comply with applicable local, state, and national codes and ordinances. Rulings and interpretations of the enforcing agencies shall be considered as part of the local codes. No extras will be permitted for furnishing items required by the local codes but not specified or shown on the drawings.

C. Codes and Standards:

1. IBC and California Amendments (California Building Code - Part 2, Title 24, CCR).
2. UMC and California Amendments (California Mechanical Code - Part 4, Title 24 CCR).
3. UPC and California Amendments (California Plumbing Code - Part 5, Title 24 CCR).
4. Uniform Fire Code with State Amendments (California Fire Code - Part 9, Title 24 CCR).
5. National Fire Protection Associations - National Fire Code.

D. Nothing in these drawings and specifications is to be construed to permit work in violation thereof. Ordinances, regulations and codes are to be construed as minimum requirements.

E. The responsibility of the Architect to conduct construction reviews of the Contractor's performance is not intended to include the adequacy of the Contractor's safety measures in, on, or near the construction site.

F. Ventilating, refrigeration and electrical equipment and appliances are required to be approved by the Underwriters' Laboratories, Inc., or other nationally recognized testing agency and installed per the testing agency's specifications.

1.7 PERMITS, FEES AND INSPECTIONS

A. Obtain and pay for all necessary permits, fees, assessments, complimentary drawings, required by any legally constituted public authorities having jurisdiction.

1.8 DRAWINGS AND SPECIFICATIONS

A. The Architect's decision will be final on interpretation of the Drawings and Specifications.

B. The Drawings and Specifications are complimentary. Any work called for on the Drawings and not mentioned in the Specifications, or vice versa, shall be performed as though fully set forth in both.

- C. Piping, ductwork and other equipment shown as existing has been taken from the Owner's drawings. Contractor shall verify exact location in field before proceeding with the work.
- D. Where codes, standards, drawings or specifications conflict, the most stringent shall prevail, unless prior approval for variance is obtained. Specific details on the drawings shall supersede the specification in the event of a conflict.
- E. Alternate support or seismic detail proposed by contractor shall have prior approval by the Architect; and the Contractor shall obtain agency approval without any additional cost or time to the contract and without any time penalty on the work schedule.

1.9 SUBMITTALS

- A. Before starting work, the Contractor shall furnish for the approval of the Architect, Shop Drawings and Submittals with Itemized Equipment Lists, complete in all details that they proposes to install. All items shall be submitted at the same time.
- B. Submittals must be specific to this project with respect to model number, capacities, performance, etc., generic submittals will not be accepted.
- C. Variations or deviations on submitted items from that specified must be clearly tagged and / or identified
- D. Submittals shall include, but not necessarily be limited to the following which are mandatory:
 1. Draw Equipment Layouts to 1/4" scale, including equipment, piping accessories, and showing clearances for operating and servicing.
 2. Schedule of pipe, fittings, valves, with manufacturer and catalog number.
 3. Specialties, valves, gauges and thermometers of all types.
 4. Earthquake supports and calculations.
 5. Insulation.
 6. Ventilation and air conditioning equipment, specialties and the air control systems.
 7. Fans, fan characteristic curves, fan tests.
 8. Dampers, registers, diffusers.
 9. Shop fabrication drawings and installation drawings of ductwork and piping layouts. Submit for approval prior to fabrication. Drawings shall indicate dimensions from bottom of piping and ductwork to finish floor level.
 10. Wiring diagrams, control panel board, motor starters and controls for electrically operated equipment furnished by mechanical trades.
 11. Automatic control system diagrams.
 12. Exhaust fans.
 13. Access panels.
 14. Hangers, inserts, supports, anchors.
 15. Pipe, fittings and specialties.
 16. Sleeves, escutcheons, caulking, waterproofing, fireproofing.
 17. Expansion joints, guides and anchors.
 18. Shop fabrications drawings and calculations.
 19. Special and miscellaneous products furnished under this section and not listed herein.

1.10 RECORD DRAWINGS AND MANUALS

- A. Record Set During the Work: At site, maintain at least one set of Drawings as a Field Record Set. Also maintain at least one copy of all Addenda, Modifications, approved submittals, correspondence, and transmittals at site. Keep Drawings and data in good order and readily available to Architect and Owner.
- B. Changes: Clearly and correctly mark Record Drawings to show changes made during the construction process at the time the changed work is installed. No such changes shall be made in the work unless authorized by the Architect.
- C. Final Record Drawings: Conform to Division 01 requirements.

- D. Preparation of Final Record Drawings: Contractor shall transfer recorded changes in the work indicated on the Field Record Set to the record set. Changes shall be neatly and clearly drawn and noted by skilled draftsmen, and shown technically correct.
- E. Approval: Prior to Architect's inspection for Substantial Completion, submit the Final Record Drawings to the Architect for review, and make such revisions as may be necessary for Final Record Drawings to be a true, complete, and accurate record of the work.
- F. Manuals: Obtain data from the various manufacturers and submit instruction, operation, and maintenance manuals as required and to the extent required under other Sections.
- G. Contents: Each manual shall have an index listing the contents. Information in the manuals shall include not less than:
 - 1. General introductions and overall equipment description, purpose, functions and simplified theory of operation.
 - 2. Specifications
 - 3. Installation instructions, procedures, sequences, and precautions, including tolerances for level, horizontal and vertical alignment.
 - 4. Grouting requirements.
 - 5. List showing lubricants for each item of mechanical equipment and recommended lubrication intervals.
 - 6. Start-up and beginning operation procedures.
 - 7. Operational procedures.
 - 8. Shutdown procedures.
 - 9. Maintenance and calibration procedures
 - 10. Parts lists
 - 11. Name, address and telephone number of each manufacturer's local representative.
- H. Manual Submittals: Unless otherwise specified, each submittal shall include two copies of each manual, one of which will be returned to the Contractor, marked to show the required review. When approved, deliver four copies to Architect unless otherwise specified.
- I. "As-Built" drawings of ductwork and piping, including all elbows, transitions, damper and valve locations shall be provided prior to commencement of air and water balance.

1.11 QUALITY OF EQUIPMENT, MATERIALS AND WORKMANSHIP

- A. Unless otherwise specified, equipment and materials used in the installation shall be new and in perfect condition when installed. Articles provided for the same general purpose or use shall be of the same make. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. Furnish the services of an experienced superintendent, who shall be constantly in charge of the work, together with all necessary journeymen, helpers and laborers required.

1.12 SEISMIC DESIGN

- A. Contractor shall be responsible for anchors and connections of mechanical work to the building structure including calculations for approval by structural engineer or for approval by inspector of record, as applies, for items or work, where approval is deferred or where alternate support or anchorage detail is proposed to prevent damage as a result of an earthquake, including manufactured equipment, the connection and integrity of shop fabricated and field fabricated materials and equipment. The anchorage of all pipes, ducts, conduits, fixtures, equipment, etc. shall withstand the lateral forces and shall accommodate calculated building displacement as required by the California Building Code, and local city/county codes. (Building equipment and connections therefore shall be designed to resist lateral seismic forces equal to 1.0 of equipment weight to working allowable stress. Cantilever posts supporting equipment shall be designed to resist lateral seismic forces equal to 0.5 of equipment weight to allowable working stress. Conform to the following:

1. In accordance with Title 24, 2019 CBC Chapter 16A, details shall be provided for the seismic anchorage of all mechanical and electrical equipment, anchorage details shall be based upon appropriate design calculations.
2. The seismic anchorage of mechanical and electrical equipment shall conform to C.C.R. Title 24, 2019 CBC Chapter 16A. Anchorage details for roof/floor-mounted equipment shall be shown on plans.

1.13 SUBSTITUTIONS AND CHANGES

- A. The design has been based on data from certain manufacturers, suitable for each application. Recommendations for alternative manufacturers are made for each product, except when "no substitutions permitted" is indicated.
- B. It is the intent of the Owner to have this project constructed with materials, products and system originally designed and specified into the project.
- C. Alternatives that may require the modification, realignment and/or adjustment of other associated components, including impact on other trades, shall be accomplished at no additional cost or time to the contract and shall have the approval of the Architect.
- D. Substitutions shall be submitted addressing all features listed in the specifications. Features that deviate from the plans and specifications shall be clearly identified including justification for deviations. Design West Engineers will review initial submittal on substitutes only. Subsequent submittals made to correct deficiencies in original submittals will be reviewed at Contractor's expense based on Design West Engineer's hourly rate for engineering services.
- E. Should the Contractor elect to propose substitutions for the Owner's interest, the substitutions shall be in compliance with Division 01.

1.14 SUBMITTAL REVIEWS

- A. The Architect and / or Engineer will have the right to accept or reject equipment, materials, workmanship, tests and determine when the Contractor has complied with the requirements herein specified.

1.15 SELECTION AND ORDERING OF EQUIPMENT AND MATERIALS

- A. Immediately after award of the Contract and after the final review of submittals by the Architect and / or Engineer, the Contractor shall arrange for the purchase and delivery of equipment and materials required, in ample quantities and at the proper time to meet the construction schedule. The contractor shall deliver to the Architect and Owner a complete list of equipment and materials ordered, giving descriptions, plate numbers, brochures, name of the wholesalers, date of the orders and approximate delivery dates.

1.16 LOCATIONS AND ACCESSIBILITY

- A. Drawings show pipe and ductwork diagrammatically. Conform to Drawings as closely as possible in layout work. Vary run of piping, run and shape of ductwork and make offsets during progress of work as required to meet structural and other interferences as reviewed by Architect and / or Engineer. Install piping and ductwork to best suit field conditions after coordinating with other trades. Run exposed piping and ductwork parallel to, or at right angle to, building walls. Keep horizontal lines as close to bottom of structures as possible. Conform to ceiling heights established on Drawings.
- B. Install equipment in such a manner as to be readily accessible for maintenance and repairs. Install piping, ducts and conduit in such a manner as to preserve headroom, avoid obstructions and keep openings and passageways clear.

- C. Installation at valves, thermometers, gauges, cleanouts, dampers, controls, steam and water specialties, duct access doors or any other indicating equipment or specialties requiring reading, adjustment, inspection, and maintenance shall be conveniently and accessible located with reference to the finished building.
- D. Where wall and ceiling access doors are required but not shown, such doors shall be furnished under other sections and as directed by the Architect. Coordinate this requirement with appropriate trade.
- E. If changes in the indicated locations or arrangements are required, they shall be made without additional charges.
- F. In an existing area, where required, remove, reinstall, reconnect or replace, etc., any existing work to accommodate new work without any additional cost to the Owner. Material shall match existing, unless otherwise specified or approved in writing by the Architect.
- G. Provide sheaves and belts if required, to Test, Adjust and Balance Agency, to allow air moving equipment to meet flow requirements specified at no additional cost to the Owner.

1.17 COORDINATION OF TRADES

- A. Contractor shall coordinate all trades in the interest of obtaining the most practical overall arrangement of equipment, piping, conduit, and ducts and to maintain maximum headroom and accessibility.
- B. No extras will be allowed for changes made necessary by interference or coordination between trades.
- C. Submit Composite Coordination Drawings in accordance with Submittal Procedures. Include dimensioned plans, elevations, sections and details and give complete information particularly as to the kinds and types of materials and equipment, size and location of sleeves, inserts, attachments, chases, openings, conduits, ducts, boxes, lighting, structural interferences. Coordinate these Composite Coordination Drawings and field layouts in the field for proper relationship to work of applicable trades based on field conditions. Contractor shall have competent personnel readily available for coordinating, checking, and supervision of field layouts. The procedures for submittals and resubmittals, and final distribution shall be as specified in Division 01. Do not start installation of work involved under Composite Coordination Drawings until the Architect reviews applicable submittal. Discrepancies between the Drawings and Composite Coordination Drawings shall be specifically noted and identified on the Composite Coordination Drawings. Drawings for the various trades involved shall be submitted as required and reviewed prior to preparation of Composite Coordination Drawings.
 - 1. Equipment Foundations and Bases: Furnish certified details and drawings for approval before fabrication. Furnish parts necessary for each foundation subbase and support.
 - 2. Pipe Sleeves and Inserts: Furnish and install pipe sleeves and pipe support inserts before concrete is poured.
 - 3. Roof, Wall and Floor Openings: Furnish Shop Drawings showing exact locations and sizes of openings through roofs, walls and floors.
 - 4. Concrete: Conform to Concrete Section of the Specifications.

1.18 GUARANTEES

- A. Contractor shall guarantee workmanship, equipment and materials installed under his contract for a period of not less than one (1) year from the date of Substantial Completion. Should any defects occur during this period, the Contractor shall promptly repair or replace the defective item and any other damage caused to the building free of charge to the Owner, including cost of labor and materials.
- B. Guarantee included in this section to cover:

1. Faulty or inadequate design of equipment or material installed
2. Improper assembly or erection
3. Defective workmanship or material
4. Incorrect or inadequate operation or other failure

- C. The contractor shall guarantee the complete and perfect operation of the entire system and that equipment will be supported in such a way as to be free of objectionable vibration and noise
- D. Furnish the parts and labor to replace any items found to be defective in the mechanical equipment with the guarantee period.
- E. In addition to other guarantees, furnish free maintenance for the refrigeration equipment, including replacement of refrigerant and oil, for a period of one (1) year. This shall include regular monthly maintenance and "On Call" service if required.
- F. For equipment bearing a manufacturer's warranty in excess of one year, furnish a copy of the warranty and proof of shipment date or purchase date per terms of warranty to the Owner, who shall be named as beneficiary.

1.19 PROTECTION OF EQUIPMENT AND MATERIALS

- A. Provide adequate storage facilities for equipment and materials on the site and shall make provisions to protect such materials and equipment from damage.

1.20 CLOSING-IN OF UNINSPECTED WORK

- A. Contractor shall not allow or cause any of the work, specifically ductwork and piping, to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Should any of work be covered up or enclosed before such inspection and test, he shall at his own expense, uncover the work and after it has been inspected, tested, and approved, make repairs with such materials as may be necessary to restore work to its original and proper condition.

1.21 BUILDING FOOTING CLEARANCES

- A. Under no circumstances shall pipes, ducts, or conduits penetrate footings. They shall cross below footings or through sleeves above footings. Those running parallel to footings shall have the minimum clearance from the cone of influence indicated on the Drawings or as required by Code.

1.22 DAMAGE BY LEAKS

- A. Contractor shall be responsible for all damage to any part of the premises caused by rain leaks through or around ducts or pipes, leaks or breaks in piping, equipment or fixtures furnished or installed by him for a period of one (1) year from the date of Substantial Completion.

1.23 EQUIPMENT LABELS

- A. Equipment provided under this Section shall be provided with the manufacturer's metal identification labels attached to each individual piece of equipment showing complete performance characteristics, size, model and serial number.

1.24 PRELIMINARY OPERATION

- A. Should the Owner request that any portion of the plant, apparatus, or equipment be operated for the Owner's beneficial use prior to the final completion and acceptance of the work, the Contractor shall conform to Beneficial Occupancy Provisions of the General Conditions. Such operation shall be under the supervision and direction of the

Contractor. Such preliminary operation shall not be construed as an acceptance of any of the work.

1.25 ELECTRICAL WORK

- A. Coordinate with Division 26 in making the line and low voltage electrical connections and be responsible for the operation of the equipment furnished under this section.
- B. Voltage for electrical work will be included in Division 26. However, any control wiring which is required that is not shown on the control diagram shall be as described under this Section. In the event that the Contractor chooses to provide equipment that requires extra expense in the power or control wiring, he shall pay additional electrical costs.
- C. Safety switches, starters, circuit breakers, unless provided as a portion of package equipment, and the electrical connections of mechanical equipment to the electrical power service shall be provided under Division 26.
- D. Interconnecting wiring, safety switches, relays, controllers and motor starters which are integral components of packaged equipment shall be provided as an integral part of that equipment.
- E. All interconnecting power wiring and conduits shall be provided by Division 26.
- F. Control wiring shall be provided by Division 23, unless otherwise indicated on the drawings.
- G. Conduit for control wiring shall be provided by Division 26.

END OF SECTION

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Support and attachment components for equipment, piping, and other HVAC work.

1.2 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2023.
- D. MFMA-4 - Metal Framing Standards Publication 2004.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.
- C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

1.5 QUALITY ASSURANCE

- A. Comply with applicable building code.
- B. Installer Qualifications for Field-Welding: As specified in Section 055000.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
 - 1. Comply with MFMA-4.
- C. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
- D. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- C. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- D. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- F. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- G. Secure fasteners according to manufacturer's recommended torque settings.
- H. Remove temporary supports.

END OF SECTION

SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Pipe markers.

1.2 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems 2020.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials 2017.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Product Data: Provide manufacturers catalog literature for each product required.
- D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Air Handling Units: Nameplates.
- B. Piping: Pipe Markers.
- C. Thermostats: Nameplates.

2.2 NAMEPLATES

- A. Manufacturers:
 - 1. Advanced Graphic Engraving, LLC: www.advancedgraphicengraving.com.
 - 2. Brimar Industries, Inc: www.pipemarker.com.
 - 3. Kolbi Pipe Marker Co: www.kolbipipemarkers.com.
 - 4. Seton Identification Products, a Tricor Direct Company: www.seton.com.
- B. Letter Color: White.
- C. Letter Height: 1/4 inch (6 mm).
- D. Background Color: Black.
- E. Plastic: Comply with ASTM D709.

2.3 PIPE MARKERS

- A. Manufacturers:
 - 1. Brady Corporation: www.bradycorp.com.
 - 2. Brimar Industries, Inc: www.pipemarker.com.
 - 3. Kolbi Pipe Marker Co: www.kolbipipemarkers.com.
 - 4. Seton Identification Products, a Tricor Company: www.seton.com.
- B. Color: Comply with ASME A13.1.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- D. Color code as follows:
 - 1. Heating, Cooling, and Boiler Feedwater: Green with white letters.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 099123 for stencil painting.

3.2 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Measurement of final operating condition of HVAC systems.

1.2 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition 2016.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems 2008, with Errata (2019).
- C. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing 2002.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Submit to Architect.
 - 2. Include at least the following in the plan:
 - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - c. Identification and types of measurement instruments to be used and their most recent calibration date.
 - d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - e. Final test report forms to be used.
 - f. Expected problems and solutions, etc.
 - g. Criteria for using air flow straighteners or relocating flow stations and sensors.
 - h. Details of how TOTAL flow will be determined; for example:
 - 1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
 - i. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
 - j. Confirmation of understanding of the outside air ventilation criteria under all conditions.
 - k. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
 - l. Method of checking building static and exhaust fan and/or relief damper capacity.

- m. Time schedule for TAB work to be done in phases (by floor, etc.).
 - n. False loading of systems to complete TAB work, if specified.
 - o. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.
 - p. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).
 - q. Procedures for formal progress reports, including scope and frequency.
 - r. Procedures for formal deficiency reports, including scope, frequency and distribution.
- D. Field Logs: Submit at least twice a week to the Commissioning Authority.
- E. Progress Reports.
- F. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
 - 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 - 5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
 - 6. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Architect.
 - g. Project Engineer.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 - 1. AABC (NSTSB), AABC National Standards for Total System Balance.
 - 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
 - 3. SMACNA (TAB).
 - 4. Maintain at least one copy of the standard to be used at project site at all times.
- B. Air balance test shall begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
 - 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 - 2. Certified by one of the following:

- a. AABC, Associated Air Balance Council: www.aabc.com; upon completion submit AABC National Performance Guaranty.
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.2 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.
 - 8. Air coil fins are cleaned and combed.
 - 9. Access doors are closed and duct end caps are in place.
 - 10. Air outlets are installed and connected.
 - 11. Duct system leakage is minimized.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.3 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.4 RECORDING AND ADJUSTING

- A. Field Logs: Maintain written logs including:
 - 1. Running log of events and issues.
 - 2. Discrepancies, deficient or uncompleted work by others.
 - 3. Contract interpretation requests.
 - 4. Lists of completed tests.
- B. Ensure recorded data represents actual measured or observed conditions.
- C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

- G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

3.5 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- G. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- H. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- I. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near the building entries.

3.6 SCOPE

- A. Test, adjust, and balance the following:
 - 1. Packaged Heat Pumps Heating/Cooling Units.
 - 2. Exhaust Fans.
 - 3. Air Filters.
 - 4. Air Inlets and Outlets.

3.7 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
 - 1. Manufacturer.
 - 2. Model/Frame.
 - 3. HP/BHP.
 - 4. Phase, voltage, amperage; nameplate, actual, no load.
 - 5. RPM.
 - 6. Service factor.
 - 7. Starter size, rating, heater elements.
 - 8. Sheave Make/Size/Bore.
- B. V-Belt Drives:
 - 1. Identification/location.
 - 2. Required driven RPM.
 - 3. Driven sheave, diameter and RPM.
 - 4. Belt, size and quantity.
 - 5. Motor sheave diameter and RPM.
 - 6. Center to center distance, maximum, minimum, and actual.

- C. Air Cooled Condensers:
1. Identification/number.
 2. Location.
 3. Manufacturer.
 4. Model number.
 5. Serial number.
 6. Entering DB air temperature, design and actual.
 7. Leaving DB air temperature, design and actual.
 8. Number of compressors.
- D. Air Moving Equipment:
1. Location.
 2. Manufacturer.
 3. Model number.
 4. Serial number.
 5. Arrangement/Class/Discharge.
 6. Air flow, specified and actual.
 7. Return air flow, specified and actual.
 8. Outside air flow, specified and actual.
 9. Total static pressure (total external), specified and actual.
 10. Inlet pressure.
 11. Discharge pressure.
 12. Sheave Make/Size/Bore.
 13. Number of Belts/Make/Size.
 14. Fan RPM.
- E. Return Air/Outside Air:
1. Identification/location.
 2. Design air flow.
 3. Actual air flow.
 4. Design return air flow.
 5. Actual return air flow.
 6. Design outside air flow.
 7. Actual outside air flow.
 8. Return air temperature.
 9. Outside air temperature.
 10. Required mixed air temperature.
 11. Actual mixed air temperature.
 12. Design outside/return air ratio.
 13. Actual outside/return air ratio.
- F. Exhaust Fans:
1. Location.
 2. Manufacturer.
 3. Model number.
 4. Serial number.
 5. Air flow, specified and actual.
 6. Total static pressure (total external), specified and actual.
 7. Inlet pressure.
 8. Discharge pressure.
 9. Sheave Make/Size/Bore.
 10. Number of Belts/Make/Size.
 11. Fan RPM.
- G. Duct Traverses:
1. System zone/branch.
 2. Duct size.
 3. Area.
 4. Design velocity.
 5. Design air flow.

6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

- H. Air Distribution Tests:
1. Air terminal number.
 2. Room number/location.
 3. Terminal type.
 4. Terminal size.
 5. Area factor.
 6. Design velocity.
 7. Design air flow.
 8. Test (final) velocity.
 9. Test (final) air flow.
 10. Percent of design air flow.

END OF SECTION

SECTION 23 07 13

DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Duct insulation.
- B. Duct liner.

1.2 REFERENCE STANDARDS

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2021a.
- C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- D. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material) 2019.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2022a.
- G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.
- H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- B. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or ASTM E84.

2.2 GLASS FIBER, FLEXIBLE

- A. Manufacturer:
 - 1. Knauf Insulation: www.knaufinsulation.com.
 - 2. Johns Manville: www.jm.com.
 - 3. Owens Corning Corporation: www.ocbuildingspec.com.
 - 4. CertainTeed Corporation: www.certainteed.com.
- B. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch (0.029 ng/Pa s m), when tested in accordance with ASTM E96/E96M.

2.3 DUCT LINER

- A. Manufacturers:
 - 1. Knauf Insulation : www.knaufinsulation.com.
 - 2. Johns Manville: www.jm.com.
 - 3. CertainTeed Corporation: www.certainteed.com/#sle.
- B. Note: Choose the liner type - Elastomeric Foam or Glass Fiber.
- C. Insulation: Incombustible glass fiber complying with ASTM C 1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer or acrylic polymer shown to be fungus and bacteria resistant by testing to ASTM G 21.
 - 1. Apparent Thermal Conductivity: Maximum of [.24] at 75 degrees F.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated ducts conveying air below ambient temperature:
 - 1. Finish with tape and vapor barrier jacket.
 - 2. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
- D. Insulated ducts conveying air above ambient temperature:
- E. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with with calked aluminum jacket with seams located on bottom side of horizontal duct section.
- F. External Duct Insulation Application:
 - 1. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 - 2. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
- G. Duct and Plenum Liner Application:
 - 1. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
 - 2. Seal and smooth joints. Seal and coat transverse joints.
 - 3. Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for insulation thickness.
 - 4. Line supply and return ductwork 10 feet away from fans.

3.4 R-VALUE FOR INSULATION ON DUCTS SHALL BE PER TITLE-24 REQUIREMENTS

END OF SECTION

SECTION 23 08 02

INSTALLATION & ACCEPTANCE TESTING OF MECHANICAL SYSTEMS

PART 1 GENERAL

1.1 INTRODUCTION

- A. Title 24 requires the completion of applicable Certificates of Installation and Certificates of Acceptance for mechanical systems. This shall include applicable mechanical systems as defined in the energy compliance sheets included with the contract documents.

1.2 RELATED DOCUMENTS

- A. Contract drawings and specifications, general provisions of the contract, including general and supplementary conditions, mechanical provisions and Division-1 Specification sections apply to work of this section.

1.3 DESCRIPTION OF WORK

- A. Complete Title 24 required Certificate(s) of Installation (NRCI) and Certificate(s) of Acceptance (NRCA) to be completed per the contract documents.

1.4 RESPONSIBILITIES OF INSTALLING CONTRACTORS

- A. General Contractor (GC)
 - 1. Ensure that contractors identified as the contractor responsible for acceptance testing and completion of the Title 24 Certificate(s) of Acceptance are certified by the State of California or its designated body to conduct each respective test.
- B. Mechanical Contractor (MC)
 - 1. Verify proper installation and performance of mechanical services provided.
 - 2. Complete Title 24 Certificate(s) of Installation and manufacturer's pre-start checklists prior to scheduling startup/programming of mechanical control equipment.
 - a. Retain Certificate(s) of Installation in a 3-ring binder in an organized fashion. Binder is to remain on the job site
 - b. Make Certificate(s) of Installation available for building inspector's review.
 - c. Retain calibration records for equipment provided with manufacturer calibrated sensors in the Certificate(s) of Installation binder.
 - d. Correct labeling of circuits with connected equipment.
 - 3. Complete the Certificate(s) of Acceptance per the contract documents.
 - a. The company installing the mechanical systems must be an authorized Mechanical Controls Acceptance Test Employer certified by a Mechanical Controls Acceptance Test Technician Certification Provider or include in their bid the cost of retaining and overseeing a contractor who is an authorized Mechanical Controls Acceptance Test Employer to complete the acceptance testing.
 - b. At the discretion of the GC, the Mechanical Controls Acceptance Testing may be completed by the Testing & Balancing (TAB) Contractor if the TAB contractor's company and personnel meet requirements in this specification section.
 - c. Required acceptance testing must be completed by a Mechanical Controls Acceptance Test Technician employed by the Mechanical Controls Acceptance Test Employer.

- d. Retain Certificate(s) of Acceptance in a 3-ring binder in an organized fashion. Binder is to remain on the job site
 - e. Provide copies of Certificate(s) of Acceptance to the GC for review by the building inspector
 - f. Upload Certificate(s) of Acceptance to the California Title 24 Certificates of Acceptance database, if, at the time of project completion, the database is available to the public.
4. Successful completion of the required Acceptance Tests is the responsibility of the installing contractor. Any costs associated with modifications necessary to obtain compliance and re-testing of systems shall be included in the base bid of this project.

END OF SECTION

SECTION 23 09 23

DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.1 SUMMARY

- A. The Direct-Digital Control (DDC) System specified herein shall include materials, operator workstation, building controllers, sensors, control valves, wiring, installation, start-up, testing, documentation and training for a complete operable system as required for this project.
- B. Controls Engineering shall be provided by the local controls manufacturer representative.
- C. Work specified under this section shall be performed by, or under the direct supervision of the local controls manufacturer representative, or by a contractor that is certified by the controls manufacture to perform all work within Section 23 09 00 Instrumentation and Control for HVAC and those sections of 23 09 00 that have been specified herein.
- D. Alternate techniques, modifications or changes to any aspect of these specifications may be submitted as a voluntary alternate no later than (15) days prior to the bid date and with sufficient information for a complete evaluation. This information shall include product data sheets, a UL508A Standard for Industrial Control Panels statement of compliance for any locally manufactured control panels, a detailed sequence of operation and engineered shop drawing. Shop drawings shall include the following as a minimum. Point to point wiring diagrams for each piece of equipment to be controlled, a network riser diagram that will depict quantity and location of the operator workstation, controllers, routers and repeaters required for this project.

1.2 RELATED SECTIONS

- A. 01 00 00: General Requirements
- B. 01 33 00: Submittal Procedures
- C. 23 00 00: Heating, Ventilating, and Air Conditioning (HVAC)
- D. 23 08 00: Commissioning of HVAC
- E. 26 00 00: Electrical

1.3 SUBMITTALS

- A. Submit engineered shop drawings, sequences of operation, third party equipment and controls integration points and product data sheets covering all items of equipment for the proposed system prior to installation for approval. Any deviation from the contract documents shall be noted and the drawings signed and dated by the Contractor. Additionally, submit a UL508A Standard for Industrial Control Panels statement of compliance for any locally manufactured control panels.
- B. After completion of the installation and commissioning, a full set of as-built documentation shall be turned over to the Owner. The as-built shall include operation and maintenance manuals, sequence of operation, shop drawings and digital copies of the following.
 - 1. Complete DDC System database backup
 - 2. Source files for all custom written controller applications
 - 3. Source files for graphics if required for this project

1.4 WARRANTY

- A. Components, system software, and parts shall be guaranteed against defects in materials, fabrication, and execution for (1) year from date of **system acceptance**. Provide labor and materials to repair, reprogram, or replace components at no charge to the Owner during the warranty period.
- B. Provide a list of applicable warranties for components, this list shall include warranty information, names, addresses, telephone numbers, and procedures for filing a claim and obtaining warranty services.
- C. Respond to the Owner's request for warranty service within (24) hours during normal business hours. Submit records of the nature of the call, the work performed, and the parts replaced or service rendered.
- D. Contractor shall request VPN access from owner and provide remote maintenance, software updates and repair service for the duration of the warranty period.

1.5 TRAINING

- A. Provide a competent instructor who is factory trained and has comprehensive knowledge of system components and operations to provide full instructions to designated personnel in the system operation, maintenance, and programming. Training shall be specifically oriented to installed equipment and systems.
- B. Provide (8) hours of onsite owner familiarization and training for the installed system. Training shall include system overview, time schedules, emergency operation, and programming and report generation.
- C. Owner employees attending this training session shall be provided with the following documentation:
 - 1. System layout point to point connection diagram.
 - 2. System components cut sheets.
 - 3. Operations and maintenance data.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Do not store or install electronic hardware on the project until non-condensing environmental conditions have been established.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. DDC Equipment: Carrier OPEN BACnet Controls. No substitutions will be accepted.
- B. Controls installation will be by Russell Sigler Inc. Controls Group.
- C. DDC Equipment: Carrier OPEN BACnet Controls or approved equal.
- D. The local manufacture representative will operate a free 40 hour a week, toll free customer support hotline for additional user support services that are required.

2.2 SYSTEM LISTING COMPLIANCE

- A. Locally manufactured control panels shall meet all requirements as outlined by UL 508A standard and shall be both approved and listed by Underwriters Laboratories, Inc.

2.3 COMMUNICATION

- A. Controller and operator interface communication shall conform to ANSI/ASHRAE Standard 135, BACnet.
- B. Each controller shall have a communication port for temporary connection to a laptop computer or other operator interface. Connection shall support memory downloads and other commissioning and troubleshooting operations.
- C. Use owner provided Ethernet backbone for network segments.

2.4 OPERATOR INTERFACE

- A. Description. The control system shall be as shown and consist of a high-speed, peer-to-peer network of DDC controllers and a stand-alone web server operator interface. Depict each mechanical system and building floor plan by a point-and-click graphic. A web server shall gather data from this system and generate web pages accessible through a conventional web browser on each PC connected to the network. Operators with sufficient access level shall have an ability to make changes to all system and equipment graphics in the web server in addition to having full DDC system access to make configuration changes to the control system. Any tools required for making graphic changes shall be provided with web server.
- B. Operator Interface. Furnish (1) Web server interface as shown on the system drawings.
 - 1. With the use of an owner provided remote SMTP email server the operators interface web server shall notify personnel of an alarm and record information about an alarm in the DDC system.
 - 2. Any required installation or commissioning software shall be provided to the owner.
- C. Operator Functions. Operator interface shall allow each authorized operator to execute the following functions as a minimum:
 - 1. Log In and Log Out
 - 2. Point-and-click Navigation
 - 3. View and Adjust Equipment Properties
 - 4. View and Adjust Operating Schedules
 - 5. View and Respond to Alarms
 - 6. View and Configure Trends
 - 7. Manage Control System Hardware
 - 8. Manage Operator Access
- D. System Graphics. Operator interface shall be graphical and shall include at least one graphic per piece of equipment and graphics that summarize conditions on each floor of each building included in this contract. Indicate thermal comfort on floor plan summary graphics using dynamic colors to represent zone temperature relative to zone setpoint.
- E. Trend Configuration. Operator shall be able to configure trend sample or change of value (COV) interval, start time, and stop time for each system data object and shall be able to retrieve data for use in spreadsheets and standard database programs.

- F. Reports and Logs. Operator shall be able to select, to modify, to create, and to print reports and logs. Furnish the following standard system reports.
 - 1. Alarm Reports
 - 2. Schedule Reports
 - 3. Security Reports
 - 4. Commissioning Reports
 - 5. Equipment Reports

- G. Energy Conservation
 - 1. Outside Air Lockout. Lock out heating or cooling modes based on configurable outside air temperature limits.
 - 2. Demand Limiting
 - a. System shall monitor building power consumption from building power meter pulse generator signals or from building feeder line watt transducer or current transformer.
 - b. The system shall include all required hardware and software necessary to receive an Automated Demand Response (ADR) signal from the utilities Demand Response Automation Server (DRAS).
 - c. When power consumption exceeds adjustable levels, or the system receives an ADR signal from the utility, the system shall automatically adjust set points, and take other programmatic actions to reduce demand.
 - 3. Optimal Start. The system shall bring the conditioned space to within occupied set points prior to the occupied time period to ensure occupant comfort.
 - 4. Demand Controlled Ventilation (DCV). Each controlled space shall have a Carbon Dioxide (CO₂) sensor and shall maintain a ventilation setpoint through a DCV algorithm to fulfill the requirements of ASHRAE standard, 62-1989 "Ventilation for Acceptable Indoor Air Quality" (including Addendum 62a-1990).

2.5 CONTROLLERS

- A. General. The control system shall be available as a complete package with the required input sensors and devices readily available. Provide BACnet Building Controllers (BC), Advanced Application Controllers (AAC), Application Specific Controllers (ASC), and Sensors (SEN) as required.

- B. Stand-Alone Operation. Each piece of equipment shall be controlled by a single controller to provide stand-alone control in the event of communication failure.

- C. Serviceability. Controllers shall have diagnostic LEDs for power, communication, and processor.

- D. Rooftop Unit Controller (RTC). Defined as Application Specific Controllers (ASC), shall be factory installed by the HVAC manufacturer and shall control all associated HVAC rooftop equipment functions in a single zone application or as part of a zoning system application.
 - 1. Capacity control shall be based by the RTC internal time clock and setpoints (cooling and heating) coupled with a communicating room sensor. The controls shall provide separate occupied and unoccupied cooling and heating setpoints.
 - 2. RTC shall utilize up to 2 speed of fan control, up to 3 stages of cooling, and up to 4 stages of heating.
 - 3. RTC shall provide economizer control that has been certified for Fault Detection and Diagnostics (FDD) by California Energy Commission (CEC). The FDD system shall detect the following faults:
 - a. Air temperature sensor failure/fault
 - b. Not economizing when it should
 - c. Economizing when it should not
 - d. Damper not modulating
 - e. Excess outdoor air

- E. General Purpose Controller. Defined as Advanced Application Controller (AAC) shall be a solid state micro-controller with pre-tested and factory configured software designed for controlling building equipment using DDC algorithms and facility management routines. The controller shall be capable of operating in either a stand-alone mode or as part of a network.

2.6 FIELD INSTALLED SENSORS

- A. Space Temperature Sensors shall communicate to the controller over a 4-wire communication network and have setpoint adjustment, after hours override, occupancy sensor, LCD display and a communication service port.
- B. Carbon dioxide sensor (CO2) shall be integrated into the Space Temperature Sensors and have integral programming to perform automatic baseline calibration without user interface. The recommended manual recalibration period shall not be less than five years.
- C. Status indication for fans or pumps shall be provided by current sensing switch. The sensor shall be installed at the motor starter or motor to provide load indication. The unit shall consist of a current transformer, a solid state current sensing circuit (with adjustable set point) and a solid state switch. A light emitting diode (LED) shall indicate the on off status of the unit.

2.7 CONTROL PANELS

- A. Provide single-door, UL 508A Listed; NEMA Type 1, 3R or 4 to match environmental conditions, wall-mount enclosures for each system under automatic control. Mount relays, switches, and controllers in cabinet and indicators, pilot lights, push buttons and switches flush on enclosure exterior face as required.
- B. Fabricate panels from 16 gauge steel with ANSI 61 gray finish and shall include (1) black padlock handle that will accommodate a padlock with up to a 5/16-in. locking bar for secure access to the enclosure contents. All additional latches shall be black non-locking handle type.
- C. Provide engraved name plates that identify each control panel and for each component mounted to the exterior of the enclosure.
- D. Provide a complete wiring diagram, bill of material for all components and markings with the following information:
 - 1. Manufacturer's name or trademark
 - 2. Supply voltage, number of phases, frequency, and full-load current for each incoming supply circuit
 - 3. Enclosure type number

PART 3 EXECUTION

3.1 ELECTRICAL WIRING

- A. This contractor is responsible for all low voltage electrical installation and wiring for a fully operational DDC System as shown on the drawings and shall perform electrical installation in accordance with local and national electrical codes and in accordance with Division 26.
- B. Install all HVAC control wiring, 24vdc or less, in electrical metallic tubing (EMT) when wire is concealed in walls and in exposed areas. Plenum wire may be used in ceilings where anchored support is provided every 10 feet.

- C. Electrical Contractor is responsible for providing power from local electrical panels to the DDC System control panels.

3.2 ACCEPTANCE PROCEDURE

- A. Upon completion of the installation, the contractor shall start-up the system and perform all necessary calibration and testing to ensure the proper operation of the DDC System.
- B. After all calibration and testing have been completed, the contractor shall schedule a hardware demonstration and system acceptance test to be performed in the presence of the designated owner's representatives.
- C. The contractor shall be a member of the designated Commissioning Team and shall be responsible for performing procedures presented in specification and contract drawings as detailed in the Functional Performance Tests (FPT).

END OF SECTION

SECTION 23 23 00
REFRIGERANT PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping.
- B. Refrigerant.
- C. Moisture and liquid indicators.
- D. Valves.
- E. Strainers.
- F. Filter-driers.
- G. Solenoid valves.
- H. Expansion valves.

1.2 RELATED REQUIREMENTS

- A. Section 083100 - Access Doors and Panels.

1.3 REFERENCE STANDARDS

- A. AHRI 710 - Performance Rating of Liquid-Line Driers 2009.
- B. AHRI 750 - Thermostatic Refrigerant Expansion Valves 2007.
- C. AHRI 760 - Performance Rating of Solenoid Valves for Use With Volatile Refrigerants 2007.
- D. ASHRAE Std 15 - Safety Standard for Refrigeration Systems and Designation and Classification of Refrigerants 2019.
- E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2021.
- F. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes 2018.
- G. ASME B31.5 - Refrigeration Piping and Heat Transfer Components 2022.
- H. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2022.
- I. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) 2020.
- J. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service 2020.
- K. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding 2019.
- L. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical Current Edition, Including All Revisions.
- M. UL 429 - Electrically Operated Valves Current Edition, Including All Revisions.

1.4 SYSTEM DESCRIPTION

- A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- B. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.
- C. Liquid Indicators:
 - 1. Use line size liquid indicators in main liquid line leaving condenser.
 - 2. If receiver is provided, install in liquid line leaving receiver.
- D. Valves:
 - 1. Use service valves on suction and discharge of compressors.
 - 2. Use gauge taps at compressor inlet and outlet.
- E. Filter-Driers:
 - 1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.
- F. Solenoid Valves:
 - 1. Use in liquid line of single or multiple evaporator systems.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general assembly of specialties, including manufacturers catalogue information. Provide manufacturers catalog data including load capacity.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store piping and specialties in shipping containers with labeling in place.
- B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.
- C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

PART 2 PRODUCTS

2.1 PIPING

- A. Copper Tube: ASTM B280, H58 hard drawn or O60 soft annealed.
 - 1. Fittings: ASME B16.22 wrought copper.
 - 2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.
- B. Copper Tube to 7/8 inch (22 mm) OD: ASTM B88 (ASTM B88M), Type K (A), annealed.
 - 1. Fittings: ASME B16.26 cast copper.
 - 2. Joints: Flared.
- C. Pipe Supports and Anchors:

1. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch (13 to 38 mm): Malleable iron adjustable swivel, split ring.

2.2 MOISTURE AND LIQUID INDICATORS

- A. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F (93 degrees C) and maximum working pressure of 500 psi (3450 kPa).

2.3 VALVES

- A. Service Valves:
 1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or solder ends, for maximum pressure of 500 psi (3450 kPa).

2.4 FILTER-DRIERS

- A. Performance:
 1. Flow Capacity - Liquid Line: per manufacturer's recommendation, minimum rated in accordance with AHRI 710.
 2. Pressure Drop: 2 psi (14 kPa), maximum, when operating at full connected evaporator capacity.
 3. Design Working Pressure: 350 psi (2410 kPa), minimum.
- B. Cores: Molded or loose-fill molecular sieve desiccant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass into refrigerant lines.
- C. Construction: UL listed.
 1. Connections: As specified for applicable pipe type.

2.5 SOLENOID VALVES

- A. Valve: AHRI 760 I-P, pilot operated, copper, brass or steel body and internal parts, synthetic seat, stainless steel stem and plunger assembly (permitting manual operation in case of coil failure), integral strainer, with flared, solder, or threaded ends; for maximum working pressure of 500 psi (3450 kPa).
- B. Coil Assembly: UL 429 UL listed, replaceable with molded electromagnetic coil, moisture and fungus proof, with surge protector and color coded lead wires, integral junction box with pilot light.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

- A. Install refrigeration specialties in accordance with manufacturer's instructions.

- B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and avoid interference with use of space.
- D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- E. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.5.
 - 2. Support horizontal piping as indicated.
 - 3. Install hangers to provide minimum 1/2 inch (13 mm) space between finished covering and adjacent work.
 - 4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
- F. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.
- G. Provide clearance for installation of insulation and access to valves and fittings.
- H. Provide access to concealed valves and fittings. Coordinate size and location of access doors with Section 08 3100.
- I. Follow ASHRAE Std 15 procedures for charging and purging of systems and for disposal of refrigerant.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal ductwork.
- B. Duct cleaning.

1.2 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.
- E. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems 2021.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.
- G. SMACNA (FGD) - Fibrous Glass Duct Construction Standards 2021.
- H. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors current edition, including all revisions.

1.3 SUBMITTALS

- A. Product Data: Provide data for duct materials, duct liner, and duct connections.
- B. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.4 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.1 DUCT ASSEMBLIES

- A. Regulatory Requirements: Construct ductwork to comply with NFPA 90A standards.

2.2 MATERIALS

- A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
- B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - 2. VOC Content: Not more than 250 g/L, excluding water.
 - 3. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.

2.3 DUCTWORK FABRICATION

- A. Fabricate ductwork gauge in accordance with current (CMC) California Mechanical Code and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated..
- B. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.
- C. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
- D. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.
- E. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
- F. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- G. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

2.4 MANUFACTURED DUCTWORK AND FITTINGS

- A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions.
- C. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- D. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with

metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

- E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- F. Use crimp joints with or without bead for joining round duct sizes 8 inch (200 mm) and smaller with crimp in direction of air flow.
- G. Use double nuts and lock washers on threaded rod supports.
- H. Connect terminal units to supply ducts directly or with one foot (300 mm) maximum length of flexible duct. Do not use flexible duct to change direction.
- I. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet (1.5 m) maximum length of flexible duct held in place with strap or clamp.

3.2 CLEANING

- A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that could be harmed by excessive dirt with temporary filters, or bypass during cleaning.

END OF SECTION

SECTION 23 33 00

AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Duct access doors.
- D. Duct test holes.
- E. Flexible duct connectors.
- F. Volume control dampers.

1.2 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Provide instructions for fire dampers.

1.4 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

- A. Manufacturers:
 - 1. Krueger-HVAC, Division of Air System Components: www.krueger-hvac.com/#sle.
 - 2. Ruskin Company: www.ruskin.com/#sle.
 - 3. Titus HVAC, a brand of Johnson Controls: www.titus-hvac.com/#sle.
- B. Multi-blade device with radius blades attached to pivoting frame and bracket, steel construction, with worm drive mechanism with removable key operator.

2.2 BACKDRAFT DAMPERS - METAL

- A. Manufacturers:
 - 1. Louvers & Dampers, Inc, a brand of Mestek, Inc: www.louvers-dampers.com/#sle.
 - 2. Nailor Industries, Inc: www.nailor.com/#sle.
 - 3. Ruskin Company: www.ruskin.com/#sle.
 - 4. United Enertech: www.unitedenertech.com/#sle.
- B. Gravity Backdraft Dampers, Size 18 by 18 inches (450 by 450 mm) or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

2.3 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.4 FLEXIBLE DUCT CONNECTORS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
 - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd (1.0 kg/sq m).
 - 2. Metal: 3 inches (75 mm) wide, 24 gauge, 0.0239 inch (0.61 mm) thick galvanized steel.

2.5 VOLUME CONTROL DAMPERS

- A. Manufacturers:
 - 1. Louvers & Dampers, Inc, a brand of Mestek, Inc: www.louvers-dampers.com/#sle.
 - 2. Nailor Industries, Inc: www.nailor.com/#sle.
 - 3. Ruskin Company: www.ruskin.com/#sle.
- B. Fabricate in accordance with SMACNA (DCS) and as indicated.
- C. Single Blade Dampers:
 - 1. Fabricate for duct sizes up to 6 by 30 inch (150 by 760 mm).
- D. Quadrants:
 - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
 - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 233100 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

- E. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- F. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 23 34 23

HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Inline centrifugal exhaust fans.

1.2 REFERENCE STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- B. UL 705 - Power Ventilators Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C. Manufacturer's Instructions: Indicate installation instructions.

1.4 FIELD CONDITIONS

- A. Permanent ventilators may not be used for ventilation during construction.

PART 2 PRODUCTS

2.1 UPBLAST ROOF EXHAUSTERS

- A. Manufacturers:
 - 1. Greenheck Fan Corporation: www.greenheck.com.
 - 2. Loren Cook Company: www.lorencook.com
 - 3. Substitutions: See Section 016000 - Product Requirements.
- B. Centrifugal Fan Unit: V-belt or direct driven as indicated, with galvanized steel housing lined with acoustic insulation; resiliently mounted motor; gravity backdraft damper in discharge.
- C. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install flexible connections between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.
- C. Extend ducts to wall louvers.

- D. Provide sheaves required for final air balance.
- E. Install backdraft dampers on inlet to wall exhausters.

END OF SECTION

SECTION 23 37 00

AIR INLETS & OUTLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Diffusers:
- B. Round ceiling diffusers.
- C. Registers/grilles:
 - 1. Ceiling-mounted, exhaust and return register/grilles.
 - 2. Wall-mounted, exhaust and return register/grilles.

1.2 REFERENCE STANDARDS

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating 2012, with Editorial Revision (2015).
- B. ARI 890 - Standard for Air Diffusers and Air Diffuser Assemblies; Air-Conditioning and Refrigeration Institute; 2008.
- C. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets 2006 (Reaffirmed 2021).
- D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.

1.3 SUBMITTALS

- A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit sheets indicating materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and nose ratings.

1.4 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Krueger: www.krueger-hvac.com.
- B. Price Industries: www.price-hvac.com.
- C. Titus: www.titus-hvac.com.

2.2 ROUND CEILING DIFFUSERS

- A. Type: Round, adjustable pattern, stamped or spun, multi-core diffuser to discharge air in 360 degree pattern, with sectorizing baffles where indicated. Face style three cones. Diffuser collar shall project not more than 1 inch above ceiling. In plaster ceilings, provide plaster ring and ceiling plaque.
- B. Fabrication: Steel with baked enamel off-white finish.

2.3 RECTANGULAR CEILING DIFFUSERS

- A. Type: Provide square, adjustable pattern, stamped, multi-core diffuser to discharge air in four way pattern with sectorizing baffles where indicated.
- B. Frame: T-Bar and Surface mount type. In plaster ceilings, provide plaster frame and ceiling frame. In T-Bar ceiling provide filler panel.
- C. Fabrication: Steel with baked enamel off-white finish.

2.4 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting.
- C. Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.
- D. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.

2.5 WALL EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with spring or other device to set blades, vertical face.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting.
- C. Fabrication: Steel frames and blades, with factory baked enamel finish.
- D. Gymnasiums: Provide front pivoted or welded in place blades, securely fastened to be immobile.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with airtight connection.

- D. Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.

3.2 PROTECTION

- A. Protect installed products until completion of project.
- B. Replace, repair, or touch-up damaged products before Substantial Completion.

END OF SECTION

SECTION 23 40 00

HVAC AIR CLEANING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Disposable, extended area panel filters, MERV 13.
- B. Disposable pre-filters, MERV 8

1.2 REFERENCE STANDARDS

- A. AHRI 850 (I-P) - Standard for Performance Rating of Commercial and Industrial Air Filter Equipment 2013.
- B. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size 2017, with Addendum (2022).
- C. UL 900 - Standard for Air Filter Units Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on filter media, filter performance data, filter assembly and filter frames, dimensions, motor locations and electrical characteristics and connection requirements.

PART 2 PRODUCTS

2.1 FILTER MANUFACTURERS

- A. American Filtration Inc: www.americanfiltration.com.
- B. AAF International/American Air Filter: www.aafintl.com.
- C. The Camfil Group: www.camfilfarr.com.

2.2 DISPOSABLE, EXTENDED AREA PANEL FILTERS

- A. Media: UL 900 Class 1, pleated, lofted, non-woven, reinforced cotton fabric; supported and bonded to welded wire grid by corrugated aluminum separators.
 - 1. Frame: Non-flammable.
 - 2. Nominal size: 24 by 24 inches (610 by 610 mm).
 - 3. Nominal thickness: 2 inches (50 mm).
- B. Minimum Efficiency Reporting Value (MERV): 13, when tested in accordance with ASHRAE Std 52.2.
- C. Rating, per ASHRAE Std 52.2:
 - 1. Weight arrestance: 97 percent.
 - 2. Initial resistance at 500 FPM (2.54 m/sec) face velocity: 0.30 inch WG (75 Pa).
 - 3. Recommended final resistance: 1.0 inch WG (250 Pa).

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install air cleaning devices in accordance with manufacturer's instructions.
- B. Prevent passage of unfiltered air around filters with felt, rubber, or neoprene gaskets.
- C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing, with clean set.

END OF SECTION

SECTION 23 74 13

PACKAGED OUTDOOR CENTRAL-STATION AIR-HANDING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Outdoor grade mounted unit.
- B. Unit controls.
- C. Roof mounting curb and base.
- D. Maintenance service.

1.2 REFERENCE STANDARDS

- A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment 2023.
- B. AHRI 270 – Sound Performance Rating of Outdoor Unitary Equipment, 2015, with Addendum (2016).
- C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.
- D. Unit shall be UL Tested and Certified

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- C. Shop Drawings: Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- E. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.
- B. Unit shall be stored and handled per manufacturers recommendations.
- C. Lifted by crane requires either shipping top panel or spreader bars.
- D. Unit shall only be stored or positioned in the upright position.

1.5 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for refrigeration compressors. Provide one year warranty on other parts within the unit.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Carrier Corp: www.carrier.com/#sle.
- B. Or approved equal.

2.2 MANUFACTURED UNITS

- A. General: Grade mounted , electrically controlled, heating and cooling unit utilizing fully hermetic scroll compressors for cooling duty and optional electric heat for heating duty.
- B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, return fan,, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.
- C. Disconnect Switch: To be provided and installed by electrical contractor.

2.3 FABRICATION

- A. Cabinet: Galvanized steel, and shall be bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2 in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the heat compartment. Base of unit shall have a minimum of four locations for thru-the-base gas and electrical connections (factory-installed or field-installed), standard.
- B. Base Rail:
 - 1. Unit shall have base rails on a minimum of 2 sides.
 - 2. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
 - 3. Holes shall be provided in the base rail for moving the rooftop by fork truck.
 - 4. Base rail shall be a minimum of 16 gage thickness
- C. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 210/240 or 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
- D. Evaporator Fan: shall be a Vane Axial fan design, two separate assemblies and provide two stage cooling capacity control, the indoor fan speed is automatically controlled to meet the code-compliant <66% low fan speed and 100% at full fan speed operation.

- E. Evaporator Motor: Shall be direct drive ECM design with inherent automatic-reset thermal overload protection, have permanently lubricated bearings, and Shall be internally protected from electrical phase reversal and loss.

2.4 EVAPORATOR COIL

- A. Standard evaporator coil shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
- B. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.

2.5 COMPRESSOR

- A. Unit shall use two tandem scroll compressors on single independent refrigeration circuit.
- B. Unit shall have single circuit and two stage cooling with two compressors.
- C. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
- D. Compressors shall be internally protected from high discharge temperature conditions.
- E. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
- F. Compressor shall be factory mounted on rubber grommets.
- G. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.

2.6 CONDENSER COIL

- A. Standard condenser coil shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
- B. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
- C. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor. Provide high efficiency fan motors.
- D. Provide refrigerant pressure switches to cycle condenser fans.

2.7 CONDENSER FAN AND MOTOR

- A. Motor shall be TEFC, use permanently lubricated bearings, have inherent thermal overload protection with automatic reset feature and use shaft-down design.
- B. Fan shall be direct-driven propeller type and have galvalum blades riveted to steel spider that have corrosion-resistant properties and shall be dynamically balanced.

2.8 RETURN AIR FILTER SECTION

- A. Filters shall be held in place by a pivoting filter tray, facilitating easy removal and installation.
- B. Filters shall be factory installed, low velocity, MERV 8 and MERV 13, standard sizes and commercially available.

2.9 ECONOMISER SECTION

- A. Integrated, gear driven opposing modulating blade design type capable of simultaneous economizer and compressor operation.
- B. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable.
- C. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
- D. Ultra Low Leak design meets California Title 24 section 140.4 and ASHRAE 90.1 requirements for 4 cfm per sq ft on the outside air dampers and 10 cfm per sq ft on the return dampers.
- E. Economizer controller with SystemVu™ controls shall be a 4-20mA design controlled directly by the controller. SystemVu controller meets California Title 24, ASHRAE 90.1 and IECC Fault Detection and Diagnostic (FDD) requirements.
- F. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.
- G. Shall be capable of introducing up to 100% outdoor air.
- H. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
- I. Dry bulb outdoor air temperature sensor shall be provided as standard. Enthalpy sensor is also available on factory installed only. Outdoor air sensor setpoint shall be adjustable and shall range from 40°F to 100°F (4°C to 38°C).
- J. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy.
- K. Dampers shall be completely closed when the unit is in the unoccupied mode.
- L. Economizer controller shall accept a 2 to 10 vdc CO₂ sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
- M. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
- N. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.

2.10 LOW AMBIENT CONTROL PACKAGE

- A. Controller shall control coil head pressure by condenser fan speed modulation or condenser fan cycling and wind baffles.
- B. Shall consist of solid-state control and condenser coil temperature sensor to maintain condensing temperature between 90°F (32°C) and 110°F (43°C) at outdoor ambient temperatures down to 0°F (-18°C).

2.11 CENTRIFUGAL FAN POWER EXHAUST

- A. Power exhaust shall be used in conjunction with an integrated economizer.

- B. Independent modules for vertical or horizontal return configurations shall be available.
- C. Horizontal power exhaust shall be mounted in return ductwork.
- D. Power exhaust shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0 to 100% adjustable setpoint on the economizer control.

2.12 TIME GUARD

- A. Shall prevent compressor short-cycling by providing a 5 minute delay (± 2 minutes) before restarting a compressor after shutdown for any reason.
- B. One device shall be required per compressor.

2.13 ELECTRIC HEAT

- A. Heater element open coil resistance wire, nickel-chrome alloy, 0.29 inches inside diameter, strung through ceramic insulators mounted on metal frame. Coil ends are staked and welded to terminal screw slots.
- B. Heater assemblies are provided with integral fusing for protection of internal heater circuits not exceeding 48 amps each. Auto reset thermo limit controls, magnetic heater contactors (24 v coil) and terminal block all mounted in electric heater control box (minimum 18 ga galvanized steel) attached to end of heater assembly.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Verify that proper power supply is available.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NFPA 90A.

3.3 SYSTEM STARTUP

- A. Prepare and start equipment. Adjust for proper operation.

3.4 CLOSEOUT ACTIVITIES

- A. Demonstrate operation to Owner's maintenance personnel.

3.5 MAINTENANCE

- A. Provide service and maintenance of packaged roof top units for one year year from Date of Substantial Completion.
- B. Provide routine maintenance service with a two month interval as maximum time period between calls.
- C. Include maintenance items as outlined in manufacturer's operating and maintenance data, including minimum of six filter replacements, minimum of one fan belt replacement, and controls check-out, adjustments, and recalibration.

- D. After each service call, submit copy of service call work order or report that includes description of work performed.

END OF SECTION

SECTION 260000

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE

- A. Work of this section includes everything necessary for or incidental to completing the electrical work, to provide a complete and operable electrical system, except as herein specifically excluded.

1.2 GENERAL REQUIREMENTS

- A. Electrical System Characteristics: 208/120V. 3PH, 4W.
- B. Guarantee: Furnish a written guarantee for a period of one-year from date of acceptance.
- C. Codes and Regulations: Work done under this Section shall comply with the latest edition of the following: California Electrical Code, State of California Title 24, State Building Standards, Occupational Safety and Health Administration (OSHA) requirements, State of California Title 17 and to all local codes having jurisdiction. In the case where the codes have different levels of requirements, the most stringent rule shall apply.
- D. Wherever a discrepancy in quantity or size of conduit, wire, equipment, devices, circuit breakers, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to insure complete and operable systems as required by the Owner and Engineer.
- E. The General and Supplementary Conditions, as well as Special Conditions apply in addition to items in the Electrical Section. Special attention is directed to the following sections:
 - 1. Drawings and Specifications at the site.
 - 2. Shop drawings and samples.
 - 3. Record drawings.
 - 4. Cutting and Patching.
 - 5. Cleaning up.
 - 6. Guarantee.
 - 7. Tests.
- F. Additional Work: Refer to Mechanical and Plumbing specifications for additional Electrical requirements.
- G. Provide minimum of twenty percent (20%) spare fuses of each size specified on plan.

H. Testing:

1. Scan:
 - a. Infrascan test of the existing power distribution system affected by the building addition (i.e. panels, switchboards) and the new branch circuit panels shall be required.
 - b. Infrascan certified reports shall be submitted on completion to the Owner and Engineer.
 - c. Scans shall be performed by an independent testing laboratory with total connected loads in operation.
2. Megger:
 - a. New branch circuit - phase, neutral and ground conductors.
 - b. New insulated bonding conductors.
3. All circuits shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.
4. Grounding System: Shall be tested by an independent testing laboratory to meet resistance specified in Part 3.1, D.3 of these Specifications. It shall be this Contractor's responsibility to make adjustments, as required, to upgrade non-complying systems to proper and safe operation.
5. All certified testing reports shall be submitted to the Owner at completion of project.

I. All Core Cutting, Drilling, and Patching:

1. For the installation of work under this Section, the aforementioned shall be performed under this Section of the Specifications and the Concrete section of the Specifications.
2. No holes will be allowed in any structural members without the written approval of D.S.A. or the Structural Engineer.
3. For penetrations of concrete slabs or concrete footings, the work will be as directed in the Concrete Section of Specifications.
4. The contractor shall be responsible for patching and repairing surfaces where he is required to penetrate for work under this contract.
5. Penetrations shall be sealed to meet the rated integrity of the surface required to be patched and repaired. The patched surface shall be painted or finished to match the existing surface.

J. Verifying Drawings and Job Conditions:

1. This Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.
2. This Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment shall be made and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.

K. Shop Drawings:

1. Drawings shall be submitted in six (6) bound sets accompanied by Letter of Transmittal, which shall give a list of the number and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets.
2. The Drawings submitted shall be marked with the name of the project, numbered consecutively and bear the approval of the Contractor as evidence that the Drawings have been checked by the Contractor. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.

3. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in his letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper adjustment which may be caused by the substitution. Samples shall be submitted when requested.
4. Shop drawings shall be submitted on the following but not limited to:
 - a. Branch Circuit/Distribution panels.
 - b. Fire alarm system.
 - c. Pull and Junction boxes.
 - d. Wire/Cable.
 - e. Conduit and fittings.
 - f. Conduit supports.
 - g. Communications system (Data/Network, Paging, Security, Clock, Door Access, Video surveillance).
 - h. Lighting Controls.
 - i. Light fixtures, LED Drivers.
 - j. Switches/Dimmers.
 - k. Safety/Disconnect switches.
 - l. Receptacles.
 - m. Circuit breakers and mounting hardware.
 - n. Transformers.
 - o. Multi-Use Sound system.
- L. Drawings of Record: The Contractor shall provide and keep up-to-date, a complete record set of blueprints. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without definite instruction in each case. Upon completion of the work, a set of reproducible Contract Drawings shall be obtained from the General Contractor and all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.3 WORK IN COOPERATION WITH OTHER TRADES

- A. Examine the Drawings and Specifications and determine the work to be performed by the site utilities contractor, electrical, mechanical, plumbing, building contractor and other trades. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, disconnects, relays, and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment.

- B. Provide power and control circuits, conduit and wire as indicated on the Mechanical and Plumbing drawings as required for complete and operable systems.
- C. The electrical contractor shall be responsible for obtaining back-boxes for all communication/ signal system devices/equipment from the low voltage contractor's for rough-in. He shall coordinate the delivery of the backboxes to avoid building construction delays. In the event that the backboxes are not delivered as scheduled, the electrical contractor shall be responsible for installing the correct backboxes, patching and refinishing walls disturbed by the installation of the subject backboxes.

1.4 TESTING AND ADJUSTMENT

- A. Upon completion of all electrical work, this Contractor shall test all circuits, switches, motors, breakers, motor starter(s) and their auxiliary circuits and any other electrical items to insure perfect operation of all electrical equipment.
- B. Equipment and parts in need of correction and discovered during such testing shall be immediately repaired or replaced with all new equipment and that part of the system shall then be retested. All such replacement or repair shall be done at no additional cost to the Owner.
- C. All circuit shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.
- D. All certified testing reports shall be submitted to the Engineer at completion of project.

1.5 IDENTIFICATION

- A. Identification nameplates shall be Micarta 1/8" thick and of approved size, with bevelled edges and engraved white letters 1/4" high minimum on black background. Nameplates shall be provided for all circuits in the distribution switchboards, and selector switches. Inscriptions on equipment shall be identical to those indicated in panels and/or motor control centers and other similar devices. Each nameplate shall be provided with drillings and suitable mounting screws corresponding to finish of the nameplate. The inscriptions in each nameplate shall be as indicated on the Drawings.
- B. Identification of Air Conditioning Equipment: Equipment to be so identified shall include, but shall not be limited to: Pressure and temperature controllers; switches; equipment motors and boxes or cans housing other control items. Mechanical equipment nameplates shall have letters a minimum of 3/8" high.

1.6 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRINGDIAGRAMS

- A. Prior to final acceptance of the job, the Electrical Contractor shall furnish to the Owner at least four (4) copies of operating and maintenance and servicing instructions, as well as four (4) complete wiring diagrams for the following item(s) or equipment:
 - 1. Fire alarm system.
 - 2. Circuit breakers.
 - 3. Communications system.
 - 4. LED drivers.
 - 5. Lighting controls.
 - 6. Transformers.
 - 7. Sound system.

- B. All wiring diagrams shall specifically cover the system supplied. Typical drawings will not be accepted. Two (2) copies shall be presented to the Electrical Engineer and four (4) copies to the Owner.

1.7 ELECTRICAL CONTRACTOR'S RESPONSIBILITY

- A. It shall be the Electrical Contractor's responsibility to obtain a complete set of Drawings and Specifications. He shall check the Drawings of the other trades and shall carefully read the entire Specifications and determine his responsibilities.
- B. The contractor shall be responsible for reviewing the plans and specifications to ensure each room, where electrical line or low voltage equipment is to be installed, has sufficient space to accommodate the system cabinets, equipment and terminations while maintaining code mandated clearances about said equipment. The contractor shall identify problem areas prior to bid, include all costs required for corrective measures in his bid and submit alternate equipment and materials suitable for the installation to the Architect/Engineer for acceptance as part of the product submittal process.

1.8 FINAL INSPECTION AND ACCEPTANCE

- A. After all requirements of the Specifications and/or the Drawings have been fully completed, representatives of the Owner will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.
- B. Final acceptance of the work will be made by the Owner after receipt of approval and recommendation of acceptance from each representative.

1.9 RECORD DRAWINGS

- A. Contractor shall furnish one set of reproducible record drawings before final payment of retention.

1.10 SUBSTITUTIONS

- A. Substitution to specified equipment shall be submitted and received by the Engineer fifteen (15) days after the bid date for review and approval. Obtain D.S.A. approval for all substitutions.
- B. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letter form and identify the specified values/materials alongside proposed equal values/materials. In addition, catalog brochures and samples must be included in the submittal.
- C. In the event that authorization is given for a substitute equal to bid, after award of contract the Contractor shall submit to the Engineer certified quotations from suppliers of both the specified and proposed equal material for price comparison and delivery dates.
- D. In the event of cost reduction, the Owner will be credited with 100 percent of the reduction, arranged by Change Order.
- E. The Contractor warrants that substitutions proposed for specified items will fully perform the functions required.
- F. Substitutions or requests for substitution shall not be accepted and rejected for failure to comply with items A-E above.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials and Equipment: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety. In addition, the materials and equipment shall comply with the requirements of the following:
1. American Society of Testing Materials (ASTM).
 2. Insulated Cable Engineers Association (ICEA).
 3. National Electrical Manufacturer's Association (NEMA).
 4. National Fire Protection Association (NFPA).
 5. American National Standard Institute (ANSI).
- B. Switchboard - Circuit Breaker.
1. Circuit breakers shall match existing in manufacturer, operation and short circuit duty. Provide new circuit breakers with required mounting hardware.
 2. Circuit breakers ampere interrupting capacity (AIC) shall be equal to or greater than the highest AIC rating of any existing circuit breaker in the switchboard.
 3. Circuit breakers shall be the number of poles and current capacity as indicated on the single line diagram.
 4. Circuit breakers shall be provided with a device for locking circuit breaker in "OFF" position.
 5. Provide screw-on nameplates for all feeder circuit breakers. Nameplates shall be 1/8" thick, Micarta or Lamacoid plate or approved size, with bevelled edges and engraved white letters on black background.
 6. Provide custom steel covers to safe-off unused openings in the switchboard enclosure.
 7. Refer to Section 26 05 73 for additional requirements. Circuit breakers and the overcurrent protective device coordination study must be submitted concurrently. A circuit breaker submittal that does not include the overcurrent protective device coordination study will be considered incomplete and returned as "revise and resubmit".
- C. Power Distribution Panels:
1. Power distribution panelboards shall be floor mounted, dead front, totally metal enclosed, NEMA 3R enclosure for outdoor locations, NEMA 1 enclosure for indoor locations, requiring front access only equipped with thermal-magnetic bolt-on type circuit breakers. Panels shall be minimum 32" wide, 18" deep and 90" high unless otherwise required by quantity of circuits indicated on the Single Line Diagram. Provide panelboards with a cable termination section to allow all feeder conductors to terminate at the panel. Panelboard and panelboard components shall be as manufactured by Eaton Cutler-Hammer or approved equal Siemens, Square D or General Electric. Equipment manufactured by third party OEM is not acceptable.
 2. Circuit breakers shall be fully rated to provide the symmetrical interrupting capacity indicated on the single line diagram. Circuit breakers shall be the number of poles and current capacity as indicated on the single line diagram. Circuit breakers shall be fully coordinated to ensure a local fault does not trip any upstream circuit breaker.

3. Provide screw-on nameplates for all feeder circuit breakers and the panelboard cover. Nameplates shall be 1/8" thick, Micarta or Lamacoid plate or approved size, with bevelled edges and engraved white letters on black background.
4. All wiring shall be neatly arranged and laced together.
5. All circuit breakers shall be capable of being locked in the "OFF" position with terminals/lugs UL listed for 75°C.
6. Phase, neutral and ground bus bars shall be full size/height, rectangular in cross section, constructed of copper and interconnection.
7. Refer to Section 26 05 73 for additional requirements. Panelboards and the overcurrent protective device coordination study must be submitted concurrently. A Panelboard submittal that does not include the overcurrent protective device coordination study will be considered incomplete and returned as "revise and resubmit".

D. Branch Circuit Panels:

1. Branch circuit panelboards shall be of the dead front safety type equipped with thermal-magnetic bolt-on type 40 deg C. circuit breakers. Panels shall be minimum 20" wide and 5-3/4" deep unless otherwise noted on plan. Panels shall be 3 phase, 4 wire, number of circuits shall be as indicated on the panel schedules. Provide panels with main circuit breakers/lugs and branch circuit breakers of the rating indicated on the panel schedule.
2. Circuit breakers shall be fully rated to provide the symmetrical interrupting capacity indicated on the panel schedule. Circuit breakers shall be the number of poles and current capacity as indicated on the panel schedule. Branch circuit panelboards shall be Eaton Cutler/Hammer or approved equal Siemens, Square D or General Electric to match the power distribution panelboard. Equipment manufactured by third party OEM is not acceptable.
3. Trims shall have doors equipped with flush type combination lock and catch, two milled type keys supplied with each panel. All locks shall be keyed alike and each door shall have a plastic covered directory frame with a typed identification card of all circuit and panel numbers for branch circuit panelboards and engraved lamacoid nameplates for power distribution panelboards.
4. Provide nameplate for all panelboards, 1/8" thick, Micarta or Lamacoid plate of approved size, with bevelled edges and engraved white letters on black background. Install nameplates on exterior trim of panel, above the panel door.
5. All wiring shall be neatly arranged and laced together.
6. All circuit breakers shall be capable of being locked in the "OFF" position with terminals/lugs UL listed for 75°C.
7. Phase, neutral and ground bus bars shall be full size, rectangular in cross section, constructed of copper and interconnections.
8. Where indicated on plan, panels housing time clocks and contactors for exterior lighting shall be provided with an auxiliary section. Panel shall consist of a two-section panelboard with two boxes and a single trim with two doors, each door with their own lock.
9. Refer to Section 26 05 73 for additional requirements. Panelboards and the overcurrent protective device coordination study must be submitted concurrently. A Panelboard submittal that does not include the overcurrent protective device coordination study will be considered incomplete and returned as "revise and resubmit".

E. Conduit:

1. Rigid conduit shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing or sherardizing process.
2. Galvanized Rigid Conduit (GRC), shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing, or sherardizing process.
3. Intermediate Metal Conduit (IMC), shall be hot-dipped galvanized in accordance with UL 1242 and meeting Federal Specification WWC-581 (latest revision).
4. Electrical Metallic Tubing (EMT), shall be zinc-coated steel with baked enamel or plastic finish on inside surfaces.
5. Flexible metal conduit shall be constructed of aluminum or hot-dipped galvanized steel strips wound spirally with interlocking edges to provide greatest flexibility with maximum strength. Interior surfaces shall be smooth and offer minimum drag to pulling in conductors. Used only as directed by the Engineer.
6. Liquid-tight conduit (Seal-Tite) shall be galvanized steel flexible conduit as above except with moisture and oil-proof jacket, pre-cut lengths and factory installed fittings. For outdoor installations and motor connection.
7. Non-Metallic Conduit:
 - a. Polyvinyl chloride (PVC) rigid conduit, Schedule 40, Type II for underground installation only.
 - b. Conduit and fitting shall be produced by the same manufacturer.

F. Fittings:

1. Condulet type fittings shall be smooth inside and out, taper threaded with integral insulating bushing and of the shapes, sizes and types required to facilitate installation or removal of wires and cables from the conduit and tubing system. These fitting shall be of metal, smooth inside and out, thoroughly galvanized, and sherardized cadmium plated.
2. Metallic condulet covers shall have the same finish as the fitting and shall be provided for the opening of each fitting where conductor do not pass through the cover.
3. Connector, coupling, locknut, bushings and caps used with rigid conduit shall be steel, threaded and thoroughly galvanized. Bushings shall be insulated.
4. EMT fittings, connectors and couplings, shall be steel, zinc or cadmium plated, raintight, threadless, compression or tap-on multiple point, steel locking ring type with insulated throat.
5. Flexible steel conduit connectors shall be or malleable iron clamp or squeeze type or steel twist-in type with insulated throat. The finish shall be zinc or cadmium plating.
6. Die cast, set screw or indenter type fittings are not acceptable.
7. Conduit unions shall be "Erickson" couplings, or approved equal. The use of running threads will not be permitted.

G. 600 Volt Conductors - Wire and Cable:

1. All conductors shall be copper. SimPull type or equal.

2. Type THHN/THWN thermoplastic, 600 volt, UL approved, dry and wet locations, for conductor sizes up to and including #4 AWG.
3. Type XHHW cross-linked synthetic polymer, 600 volt, UL approved, for dry and wet locations, for conductor sizes #2 AWG. and above.
4. Cross-linked synthetic polymer, XHHW, 600 volts, UL approved, for installation underground, in concrete or masonry.
5. Wire and cable shall be new, manufactured not more than six (6) months prior to installation, shall have size, type of insulation, voltage rating and manufacturer's name permanently marked on outer covering at regular intervals.
6. Wire and cable shall be factory color coded by integral pigmentation with a separate color for each phase and neutral. Each system shall be color coded and it shall be maintained throughout.
7. Systems Conductor Color Coding:
 - a. Power 208/120V, 3PH, 4W:

(1) Phase A	= Black
(2) Phase B	= Red
(3) Phase C	= Blue
(4) Neutral	= White
 - b. Power 480/277V, 3PH, 4W:

(1) Phase A	= Brown
(2) Phase B	= Orange
(3) Phase C	= Yellow
(4) Neutral	= White
 - c. Ground Conductors:

(1) Green

 - d. Communication/Fire Alarm System:

(1) As recommended by the manufacturer.

8. All color coding for #8 conductor and above shall be as identified above, utilizing phase tape at each termination.
9. No conductors carrying 120 volt or more shall be smaller than #12 AWG.

H. Junction and Pullboxes:

1. For interior dry locations, boxes shall be galvanized one-piece drawn steel, knockout type, with removable, machine screw secured covers.
2. For outside, damp or interior/exterior surface mounted locations, boxes shall be heavy cast aluminum or cast iron with removable, gasketed, non-ferrous machine screw secured covers.
3. All boxes shall be sized for the number and sizes of conductors and conduits entering the box and equipped with plaster rings where required. Each conductor shall be terminated at an insulated, barriered terminal connector and completely identified with an engraved fiber identification marker, Electrovert or Underwriter's Safety Device Company.

I. Outlet Boxes:

1. For fixtures, boxes shall be galvanized, one-piece drawn steel, knockout type equipped with 3/8" fixture studs and plaster rings where required.
2. Unless otherwise noted on plan or specified herein, outlet boxes shall be 4" square x 2 1/8" deep, one-piece drawn steel, knockout type, mounted flush with in wall. Provide with plaster rings and wall plate.
3. For data and combination telephone/data system outlets, outlet boxes shall be 4 11/16" square x 2 1/8" deep, one-piece drawn steel, knockout type, mounted flush with in wall. Provided with plaster rings and leave outlet box ready for installation of Owner furnished wall plate.
4. For all other communication/signal system devices, outlet boxes shall be as recommended by the system manufacturer and provided complete with plaster rings and covers.
5. For locations where standard boxes are not suitable due to number and size of conduit to be terminated, special boxes shall be designed to fit space or meet other requirements and submitted for approval.
6. For surface mounting or exposure to wet or damp locations, outlet boxes shall be heavy cast aluminum or cast iron with threaded hubs; covers shall be watertight with gaskets and non-ferrous screws.
7. Floor boxes shall be cast iron, fully adjustable type, with flange and brass covers suitable for the outlets/connectors specified on plan and in the project manual. Boxes shall be suitable for terminating the conduit specified on plan. Wiremold Omnibox series or approved equal for 1" conduit and smaller. Wiremold Resource RFB series or approved equal for conduits larger than 1"

J. Lighting Fixtures:

1. Furnish, install and connect a lighting fixture at each outlet where a lighting fixture type symbol (designated on plans) is shown as being installed. Each fixture shall be complete with all required accessories including sockets, glassware, boxes, spacers, mounting devices, fire rating enclosure, chips and drivers.
2. LED Driver shall be Class 1, 120-277V, 50/60HZ (constant current) with surge protection in accordance with IEEE/ANSI C62.41.2 guidelines with a surge current rating of 10,000 amps. Operating temperature for interior fixtures shall range from 0°C to 35°C (32°F to 95°F). Operating temperature for exterior fixtures shall range from -40°C to 40°C (-40°F to 104°F). All defective drivers shall be replaced at no cost to the Owner.
3. LED chips shall be as manufactured by CREE, Philips-Lumileds, Nichia, Osram or approved equal.
4. Interior fixtures installed in individual rooms shall be provided with LED chips of the same manufacturer. Mixing of chip manufacturers will not be allowed. All fixtures in any one room must be replaced with new fixtures when the fixtures in the room display dissimilar illumination colors.
5. Exterior fixtures shall be provided with LED chips of the same manufacturer. Mixing of chip manufacturers will not be allowed. All fixtures within line of sight must be replaced with new fixtures when the fixtures in the line of sight display dissimilar illumination colors.
6. LED chips shall have 4000° Kelvin color temperature. Interior fixtures shall meet IESNA LM-79-08. Exterior fixtures shall meet IESNA LM-80-08.

7. Where indicated on the Lighting Fixture Schedule, interior light fixtures shall be provided with integral occupancy sensor and/or daylight sensor. Provide two (2) programming/configuration tools for programming the integral control devices.
8. Refer to Architectural reflected ceiling plan for type of ceiling being installed in each room and provide each fixture with required mounting devices and accessories for the particular ceiling.
9. All light fixtures shall be individually supported and properly anchored to the surfaces indicated on the Architectural elevations.
10. Locations of fixtures shall be per the architectural reflected ceiling plan and shall be coordinated at time of rough-in.

K. Switches:

1. Standard single pole switches shall be flush tumbler, A.C. rated, quiet type, heavy duty back or side wired with binding screws, standard rocker Hubbell #1221, 20A, 120/277V, or approved equal, color as elected by Architect. Two pole three-way and other switches shall be similar. Refer to Device Plate Section of Specifications for other requirements.
2. Dimmers shall be provided with multi-function tap switch with small, raised rocker for dimmer adjustment. Dimmer shall perform the following functions: Rocker shall raise/lower light levels with the new level becoming the current preset level. Switch single tap raises lights to preset level or fades lights to off. Switch double tap raises light to full on level. Switch tap and hold slowly fades lights to off over an extended period. LEDs adjacent to tap switch indicate light level when dimmer is on, and function as locator light when dimmer is off. The contractor shall ensure the dimmers are fully compatible with the LED drivers being controlled. System dimmers shall be fully compatible with the Acuity nLight automatic lighting control system.
3. Switches located outdoors or in damp or wet locations shall be the same as above provided with steel locking weatherproof lift cover.
4. Switches controlling or disconnecting single phase motor loads in excess of 1/3HP shall be horsepower rated and approved or motor control service. Switches shall be complete with overload device of proper motor nameplate rating, where required.
5. Disconnect (safety) switches shall be fused, heavy duty type meeting NEMA Specifications. Switches shall be provided with rejection type fuse blocks. Provide switches with the number of poles, the voltage, current and horsepower ratings as required. Provide externally operable, quickmake, quick-break type mechanism with cover interlock and padlockable in either the open or closed position. Unless indicated otherwise, provide switches indoors in NEMA Type 1 enclosure and in NEMA Type 3R rain-tight enclosure where indicated to be outdoors or weatherproof. Provide nameplate indicating equipment served. Provide unit as manufactured by Challenger or approved equal Siemens or Westinghouse.
6. Occupant sensors shall be low voltage, dual technology type, suitable for ceiling or wall mounting. Stand-alone ceiling mounted sensors shall be provided complete with relay/power pack and slave-packs to perform the switching indicated on plan. Sensors that are part of an automatic lighting control system shall be provided with integral, factory installed, connectors to accept the system control wiring. Sensors shall provide minimum 1,000 square foot coverage and provide complete coverage of the areas indicated on plan. Stand-alone sensors shall be as manufactured by Sensor Switch, Watt Stopper or Leviton. System sensors shall be as manufactured by Acuity nLight, the automatic lighting control system manufacturer, and shall be fully compatible with the lighting control system.
7. Stand-alone wall mounted, switch type, combination sensor and dimmer shall be dual technology type with single or dual circuit to provide the control indicated on plan. Sensors shall provide minimum 900 square feet major motion and 400 square feet minor motion

coverage. Sensor shall have a multi-function tap switch with small, raised rocker, for dimmer adjustment. Sensors shall be as manufactured by Sensor Switch or approved equal Lutron Maestro CL dimmer sensor, WattStopper or Leviton. Custom color as selected by the Architect. The contractor shall ensure the dimmers are fully compatible with the LED drivers being controlled.

8. All switches, dimmers and sensors shall be listed and certified by the California Energy Commission equal.

L. Automatic Lighting Controls:

1. Provide a complete and fully operable wired control system as manufactured by Acuity nLight or approved equal Lutron or Wattstopper. For proposed equipment, other than nLight, to be considered the shop drawings must include a completely re-wired copy of the City approved lighting plan indicating the wiring, controls and connections to light fixtures required for the operation of the alternate system. The wiring and components from the specified system must be completely removed from the submitted shop drawings.
2. The wired control system shall be capable of receiving a demand response signal.
3. The lighting control system shall be provided complete with all required controllers, bridges, gateways, power supplies, occupant sensors, daylight sensors, dimmers/switches, power packs and ancillary equipment/devices required for a fully operable system.
4. The lighting control system shall be commissioned by the system's manufacturer's representative and programmed as required by the school District Maintenance & Operations Department.
5. Provide a minimum of four hours of training for personnel selected by the School District. Training shall include a follow-up training session to be scheduled three (3) months after the initial training session is completed. All training shall be conducted at the School District facility.

M. Receptacles:

1. Convenience outlet shall consist of duplex convenience receptacle mounted in an outlet box in the wall, flush with the finish surface and shall be complete with wall plate.
2. Receptacles for convenience outlets, unless otherwise indicated, shall be industrial heavy duty type, duplex 3W grounding type, 20A, 125V, Hubbell-Bryant #5362-*. (*) color as selected by Architect.
3. Weatherproof receptacle shall be industrial heavy duty type, extra duty, ground fault interrupter, 20 ampere, three wire grounding type, 120 volt, Hubbell-Bryant # GFSG-5362-W, with steel lockable lift cover U.L. listed for "wet" locations when in operation.
4. Receptacles located outdoors shall be provided with steel weatherproof box and lockable lift cover U.L. listed for "wet" locations when in operation.
5. Receptacles in indoor damp locations shall be 20A, 125V, Hubbell-Bryant #5362WR or approved equal, color as selected by Architect. Provide with steel locking lift cover, Hubbell-Bryant #96067 or approved equal.
6. Specialty receptacles, identified on plans, for use with Owner furnished equipment shall be provided complete with outlet box, wall plate and receptacle to match the configuration of the plug being provided with the subject equipment.

N. Device Plates:

1. Shall be smooth thermoplastic wall plates, for the number of gang and types of openings necessary. Color shall match device or as selected by the Architect.
2. Plates shall be fitted, when specified for more than two gangs.
3. All switch and receptacle plates shall be engraved with related serving panel and circuit number identification on the front.
4. Wall plates for switches used in conjunction with lighting control panels/systems shall be as manufactured by the lighting control system manufacturer to match the switch and/or dimmer.

O. Terminal Cabinets:

1. Terminal cabinets shall be fabricated of hot dipped galvanized code gauge sheet metal for flush or surface mounting, as indicated on plan, size as indicated on plan but in no case less than 24" high, 30" wide and 6" deep. Doors shall be hinged and lockable. Locks shall be keyed to match the branch circuit panelboards. Terminal cabinet trims shall match the branch circuit panels.
2. Provide each terminal cabinet with a full size plywood backboard and terminal blocks (minimum 25% or 12 spare terminal blocks). All wires terminating on the terminal blocks shall be identified with an engraved fiber tag.
3. Surface mounted terminal cabinets shall be installed complete with full length skirts of the same construction and finish as the terminal cabinet.
4. Where mounted outdoors, terminal cabinets shall be NEMA 3R, weatherproof complete with gaskets and required sealant to prevent moisture from entering the terminal cabinet

P. Plywood Backboards:

1. Where indicated for telephone or communications system terminals or other equipment assemblies, provide full room height and width backboards. Use Douglas Fir Plywood, fire resistive, exterior grade, finished one side and prime coat painted on all surfaces with finish coat of gray enamel. Unless otherwise indicated, use 3/4" thick plywood. Where terminal cabinets are used, provide full size plywood backboard to mount inside the terminal cabinet.

Q. Painting:

1. Terminal cabinets, panels, junction boxes, pull boxes, etc., and conduit installed outdoors and in public view shall be painted with colors selected by the Architect to match the subject exterior surface. Refer to painting section of the specifications for additional requirements.

R. Seismic Design and Anchoring of Electrical Equipment:

1. Seismic anchorage of electrical equipment shall conform to C.C.R. Title 24, 2022 CBC with California Amendments. Anchorage details for roof/floor mounted equipment shall be as shown on plans.

S. Transformers (600V and below):

1. Transformers shall be self-cooled type with copper windings, Class H insulation and a temperature rise of 115°C in 40°C ambient under continuous full load conditions, kilovolt ampere ratings shall be as shown on the Drawings. Design, construction, and operational characteristics shall be in accordance with ASA, AIEE, and NEMA standards. All insulating materials shall be in accordance with NEMA ST20-1972 Standards for a 220°C, UL component recognized insulation system. Step-up transformer primary windings shall be

rated at 208V, with six (6) 2-1/2 percent full capacity taps, two above and four below normal. Secondary windings shall be rated at 480/277V, 3 phase with neutral brought out. Step-down transformer primary windings shall be rated at 480V, with six (6) 2-1/2 percent full capacity taps, two above and four below normal. Secondary windings shall be rated at 208/120V, 3 phase with neutral brought out. Windings shall be of the fire-resistant type, designed for natural convection cooling through air circulation. Coils with exposed wire shall not be accepted. Core mounting frame and enclosures shall be of the welded and bolted construction, seismic rated, with sufficient mechanical rigidity and strengths to withstand shipping, erection and short circuit stresses. Enclosure shall be suitable for outdoor installation and shall have suitable ventilating openings with rodent-proof screens. Transformers shall be furnished complete with mounting channel and mounting bolts. Enclosures shall be provided with lifting lugs and jacking plates as required. Noise level shall be guaranteed by the manufacturer not to exceed 45 decibels for transformers up to and including 50 KVA, 50 decibels up to and including 112-1/2KVA, 55 decibels up to and including 300KVA as measured by NEMA Standards. Transformers shall be provided with vibration dampers consisting of Korfund spring loaded shock mounts and Elasti-zorb sheeting. Size and number of shock mounts shall be in accordance with manufacturer's recommendations for accommodation of weight and dampening of critical sound frequencies. Mounting bolts on floor mounted transformer shall extend into pads only and shall not be in direct contact with building structural members. All conduit shall be isolated from transformer enclosures by the use of neoprene grommets at conduit entrances to enclosures and the use of a grounding bushing. Flexible jumpers shall be installed for grounding continuity from enclosure to conduit or bus ducts. Primary and secondary terminals shall be terminated at a Micarta terminal board. A separate neutral grounding.

2. Floor mounted transformer shall be installed on concrete pad, 12" from walls and all case ventilation openings (6" where allowed by the manufacturer and approved by the Electrical Engineer).
3. Each Transformer Must Receive The Following Commercial Tests: Ratio, Polarity, Exciting Current, No-Load Loss, Resistance, Copper Loss, Impedance, Induced and Applied Potential Test. Approval shall be granted unless certified test reports covering commercial tests are made available for each unit with shop drawing submittal.
4. Each transformer shall be furnished with a manufacturer's nameplate located on the front of the unit. The nameplate shall be anodized aluminum with the following information etched or stenciled on the face: Voltage, KVA Rating; Phase; DB Rating; tap adjustments and wiring diagrams.
5. For exterior locations each transformer shall be provided complete with weathershields.

PART 3 - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. Installation of Conduit and Outlet Boxes:

1. All conduit exposed or installed in concrete and masonry, shall be galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).
2. Rigid conduit may be installed under floor slabs, under concrete sidewalls as noted on the Drawings. Rigid conduit installed under slabs shall be 1" trade size minimum and shall be wrapped with 20 mil. polyvinyl chloride plastic tape. No conduit shall be installed/run horizontally in concrete slabs/floors.

3. All conduit except as hereinafter specified, installed in concrete/masonry walls, damp locations, hazardous locations, surface mounted up to 8'-0" above finished floor or subject to mechanical injury shall be heavy wall, threaded, galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).
4. Flexible steel conduit shall only be permitted to be used at light fixture outlets and connections to vibrating electrical equipment. All flexible steel conduit runs shall be less than 6'-0". All outdoor installation shall be made using liquid-tight flex with approved fittings. Use of flexible conduit shall be as approved by the Engineer.
5. Intermediate metal conduit (IMC), is approved for use in all locations as approved for GRC or EMT and in accordance with Article 345 of CEC and UL Information card #DYBY.
6. All conduit installed in the dry walls or ceilings of the building shall be steel tube (EMT), Galvanized Rigid Steel (GRC), or Intermediate Metal Conduit (IMC).
7. Conduit shall be run so as not to interfere with other piping fixtures or equipment.
8. The ends of all conduit shall be cut square, carefully reamed out to full size and shall be shouldered in fitting.
9. No running threads will be permitted in locations exposed to the weather, in concrete or underground. Special union fittings shall be used in these locations.
10. Underground conduit shall be, unless otherwise indicated, Schedule 40 PVC (polyvinyl chloride) installed at depth of not less than 24" below grade. Concrete encased with 2" minimum between conduits and 3" minimum between the last conduit and the edge of the duct-bank. Conduit separation shall be maintained using plastic spacers located at 10'-0" intervals. Where power and communication/signal conduits are run in a common trench a (12") inch minimum separation shall be maintained between power and communication/signal conduits. The grounding wire in plastic conduit shall be rated in accordance with Section 250- of 2022 CEC.
11. All underground conduit shall be 1" minimum trade size for steel and for PVC.
12. Where underground conduit runs stub-up, conduit shall transition to GRC underground. The contractor shall use GRC elbows and GRC risers wrapped in 20 mil. PVC tape for stub-ups.
13. PVC conduit shall not be run in walls or above grade.
14. Where underground conduit runs penetrate floor slab, conduit shall terminate 6" above finished floor with a grounding bushing.
15. Where conductors enter a raceway in a cabinet, pull box, junction box, or auxiliary gutter, the conductors shall be protected by a plastic bushing type fitting providing a smoothly rounded insulating surface.
16. Where conduit extends through roof to equipment on roof area, this Contractor shall provide 24 gauge galvanized sheet metal flashing cones with 4" flanges on roof surface. This flashing shall be delivered to the roofing contractor for installation. The actual location of all such roof penetrations and outlet shall be verified by the Contractor.
17. All conduit underground, in masonry and concrete and where concealed under floor slabs shall have joints painted with thread compound prior to makeup.
18. All conduit shall be supported at intervals not less than 10'-0" and within 12" from any outlet and at each side of bends and elbows. Conduit supports shall be galvanized, heavy stamped, two hole conduit clamp properly secured.

19. Where conduit racks are used the rack shall consist of two piece conduit clamps attached to galvanized steel slotted channels, properly secured via threaded rods attached directly to the building structure.
20. Nail-in conduit supports will not be allowed. One piece set-screw type conduit clamps or perforated iron for supporting conduit will not be permitted.

21. Seismic Conduit Support:

- a. All conduit shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of conduit and contents in any direction. Maximum spacing of support and braces are to be as follows:

<u>CONDUIT TYPE</u>	<u>MAXIMUM SPACING</u>
EMT, IMC	10'-0"
GRC (3/4" thru 1 1/2")	10'-0"
GRC (2" thru 2 1/2")	16'-0"
GRC (3" and larger)	20'-0"

22. All conduit runs shall be installed parallel or perpendicular to walls, structural members, or intersection of vertical planes and ceilings. Field made bends and offset shall be avoided where possible. Crushed or deformed raceway shall not be installed.
23. Open knockouts in outlet boxes only where required for inserting conduit.
24. Outlet boxes on metal studs shall be attached to metal hangers, tack welded or bolted to studs; on wood studs attachment shall be with wood screws, nails not acceptable.
25. Surface mounted panels secured to stud walls shall be secured to wall using 1/2" x 3" screws into steel backing plate provided by the Architect.
26. Provide four (4) 3/4" conduit stub-ups into accessible ceiling space from all recessed panels.
27. All boxes shall be covered with outlet box protector, Appleton SB-CK. Keep dirt from entering box or panels. If dirt does get in, it shall be removed prior to pulling wires.
28. All boxes installed outdoors shall be suitable for outdoor installations, gasketed, screw cover and painted as directed by the Architect with weatherproof paint to match building.
29. All conduit entries to outdoor mounted panels, cabinets, boxes, etc., shall be made using Myers "SCRU-TITE" hubs Series ST.
30. All conduit shall have a 200 lb test poly-propylene pull line left in place for future use in all runs tagged with a plastic tag at terminating end indicating the location of the opposite end of the conduit.
31. All rotating electrical equipment shall be supplied with flexible, liquid-tight conduit with appropriate slack and shall not exceed thirty-six (36) inches.
32. All multiple conduit runs within suspended ceilings shall be suspended from building structure by means of unistrut hangers/rack, see note 19. Refer to note 18 for support of single conduit runs within suspended ceilings. Conduit shall not be allowed to lay on ceiling or be supported from ceiling suspension wires or other suspension system.
33. All conduit shall be installed concealed in walls, under floors or ceilings. Exposed conduit will not be permitted unless specifically approved in writing by the Architect/Engineer. When approved by the Architect/Engineer exposed conduits shall be painted to match the finish of the wall or ceiling to which it is supported to.

34. Provide complete conduit system for all line voltage systems. Provide conduit for low voltage systems installed over inaccessible ceilings and in rooms with no dropped ceilings. The Contractor shall coordinate the location of inaccessible or open ceilings with the Architectural Reflected Ceiling Plan and in the filed with the ceiling contractor
35. Provide conduit stub-ups into ceiling spaces from all wall mounted communications/signal devices (except Fire Alarm) for routing of wire/cable from the devices to the designated terminal backboard or cabinet.
36. Provide a complete conduit system for routing of Fire Alarm system wire/cables.
37. Provide conduit only for routing of HVAC control wiring. Refer to Mechanical drawings for conduit requirements.
38. Provide ceiling access panels for junction/pull boxes, equipment, device/outlets installed over inaccessible ceilings. Ceiling access panels shall be minimum 12"x12" for junction/pull boxes. 24"x24" for all other applications.
39. Install two (2) 2"C. sleeves in the common wall between the ceiling space of a room on the other side of a corridor. The sleeves shall be used for routing of low voltage wire/cable thru full height walls and fire rated walls.
40. Install four (4) 2"C. sleeves in each of the common walls between the ceiling space of the Communications room and the adjacent corridor/room. The sleeves shall be used for routing of low voltage wire/cable thru the full height walls and fire rated walls.

B. Installation of 600 Volt Conductors:

1. All line voltage wire, including control circuits, shall be installed in conduit.
2. All communications wire/cable shall be listed for open wiring (without conduit) and shall be plenum rated. Communications wire/cable shall be supported by "J" hooks installed along the perimeter walls of the building or full-height interior walls. Low voltage wiring installed over inaccessible ceilings shall be installed in conduit.
3. All line voltage circuits and feeder wires shall be continuous from the service point to terminal or farthest outlet. No joints shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.
4. All low voltage wire/cables shall be continuous from the service point to terminal or farthest outlet. No joints will be allowed.
5. Thoroughly clean all conduit and wire-ways and see that all parts are perfectly dry before pulling any wires. No joint shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.
6. Provide conduit only for routing of HVAC control wiring. Refer to Mechanical drawings for conduit requirements.
7. Install UL approved, fixture wire from all lighting fixture lamp sockets into fixture outlet or junction box.

C. Joints in 600 Volt Conductors:

1. Joints in 600 volt conductors smaller than No. 4 AWG shall be made with Scotchlok spring type connectors. Wires No 4 AWG and larger shall be joined together with approved type of pressure connector and taped with #33 3M tape, three (3) layers minimum to provide insulation not less than that of conductor. Connections to switch or busbar shall be made with

one-piece copper lugs. Splicing of all 600 volt or less in-line connections #2 AWG through 350 MCM shall be made with 3M brand PST connector.

2. Joints/splices shall be done in junction or pull boxes.
3. Splices of communications wire/cable will not be permitted. Communications wire/cable shall run continuously from its point of origin to its destination point.

D. Grounding:

1. Provide grounding for entire electric installation as shown on plans and as required by applicable codes. Included as requiring grounding are:
 - a. Conduit.
 - b. Neutral or identified conductors of interior wiring system.
 - c. Switchboards and Branch Circuit Panelboards.
 - d. Non-current carrying metal parts of fixed equipment.
 - e. Telephone distribution equipment.
2. Ufer ground shall be provided at the building's "service" panel to meet the resistance specified herein. The size of the ufer grounding conductor shall be not less than that set forth in the latest edition of the California Code of Regulations, Title 24, State of California and CEC, unless otherwise indicated.
3. Grounding and bonding conductors shall be sized per the latest edition of the California Code of Regulations, Title 24, State of California and the CEC.
4. Provide and install an equipment grounding conductor in all feeder and branch circuit conduits.
5. Where required to be installed, ground rods shall be 3/4" x 10', copper clad, installed individually or grouped as required to meet the specified resistance. Provide ground rods with all required clamps, fittings, wire and concrete boxes.
6. Building grounding system resistance to ground shall not exceed 25 ohm.

- E. Prefabricated Equipment: Installation of all prefabricated items and equipment shall conform to the requirements of the manufacturer's specifications and installation instruction pamphlets. Where code requirements affect installation of materials and equipment, the more stringent requirements, code or manufacturer's instructions and/or specifications, shall govern the work.

END OF SECTION

SECTION 26 05 73

OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes arc flash study and short circuit and protective device coordination study encompassing portions of electrical distribution system from the power source or sources up to and including breakers in service entrance switchboard, main breaker in sub-distribution panels, main breaker in each panelboard and branch circuit breakers.
- B. Adjustable circuit breaker settings and non-adjustable circuit breaker selections shall be based on the results of the coordination study to ensure a local fault does not trip any upstream circuit breaker. Refer to 26 05 73 Item 1.7 for additional requirements.
- C. Panel and circuit breaker short circuit ratings shall be based on the results of the study's short circuit calculation results.
- D. Provide arc-flash labels for switchboards and panels. Labels shall indicate the nominal system voltage, arc flash PPE category, arc flash boundary, minimum arc rating of clothing.
- E. An independent consulting or testing company not involved on the project shall perform the study and prepare a complete and detailed report and shall be evaluated and accepted by the Designer for compliance and meet project needs.

1.2 REFERENCES

- A. Institute of Electrical and Electronics Engineers:
 - 1. IEEE 242 - Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (Buff Book).
- B. National Fire Protection Association:
 - 1. NFPA 70 - California Electrical Code.

1.3 DESIGN REQUIREMENTS

- A. Complete Short Circuit and Protective Device Coordination Study to meet requirements of NFPA 70.
- B. Report Preparation:
 - 1. Prepare study prior to ordering distribution equipment to verify equipment ratings required.
 - 2. Perform study with aid of computer software program.
 - 3. Obtain actual settings for packaged motor characteristics for equipment incorporated into Work.
 - 4. Calculate short circuit interrupting and, when applicable, momentary duties for assumed 3-phase bolted fault short circuit current and phase to ground fault short circuit current at each of the following:
 - a. Utility supply bus.
 - b. Automatic transfer switch.
 - c. Engine generator.

- d. Low-voltage switchgear.
- e. Switchboards.
- f. Distribution panelboards.
- g. Branch circuit panelboards.
- h. Each other significant equipment location throughout system.

C. Report Contents:

1. Include the following:
 - a. Calculation methods and assumptions.
 - b. Base per unit value selected.
 - c. One-line diagram.
 - d. Source impedance data including power company system available power and characteristics.
 - e. Typical calculations.
 - 1) Fault impedance.
 - 2) X to R ratios.
 - 3) Asymmetry factors.
 - 4) Motor fault contribution.
 - 5) Short circuit kVA.
 - 6) Symmetrical and asymmetrical phase-to-phase and phase-to-ground fault currents.
 - 7) Tabulations of calculation quantities and results.
 - f. One-line diagram revised by adding actual instantaneous short circuits available.
 - g. State conclusions and recommendations.
2. Prepare time-current device coordination curves graphically indicating coordination proposed for system, centered on conventional, full-size, log-log forms.
3. Prepare with each time-curve sheet complete title and one-line diagram with legend identifying specific portion of system covered by that particular curve sheet.
4. Prepare detailed description of each protective device identifying its type, function, manufacturer, and time-current characteristics. Tabulate recommended device tap, time dial, pickup, instantaneous, and time delay settings.
5. Plot device characteristic curves at point reflecting maximum symmetrical fault current to which device is exposed. Include on curve sheets the following:
 - a. Power company relay characteristics.
 - b. Power company fuse characteristics.
 - c. Low voltage equipment circuit breaker trip device characteristics.
 - d. Low voltage equipment fuse characteristics.
 - e. Cable damage point characteristics.
 - f. Pertinent transformer characteristics including:
 - 1) Transformer full load current.
 - 2) Transformer magnetizing inrush.
 - 3) ANSI transformer withstand parameters.
 - 4) Significant symmetrical fault current.
 - g. Pertinent motor characteristics.
 - h. Other system load protective device characteristics.

1.4 SUBMITTALS

- A. Qualifications Data: Submit the following for review prior to starting study.
 1. Submit qualifications and background of firm.
 2. Submit qualifications of Professional Engineer performing study.

- B. Software: Submit for review information on software proposed to be used in performing study.
- C. Product Data: Submit the following:
 - 1. Report: Summarize results of study in report format including the following:
 - a. Descriptions, purpose, basis, and scope of study.
 - b. Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short-circuit duties, and commentary regarding same.
 - c. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
 - d. Fault current calculations including definition of terms and guide for interpretation of computer printout.
- D. Submit copies of final report signed by professional engineer. Make additions or changes required by review comments.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with CEC requirements.
- B. Maintain one copy of each document on site.
- C. Use commercially available software, designed specifically for short circuit and protective device coordination studies with minimum of five years documented availability.
- D. Perform study in accordance with IEEE 242.

1.6 QUALIFICATIONS

- A. Study Preparer: Company specializing in performing work of this section with minimum five years documented experience and having completed five projects of similar size and complexity within the past two years.
- B. Perform study under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of California with minimum of five years experience in power system analysis. The study shall be stamped and signed by a CA registered professional electrical engineer.
- C. Demonstrate company performing study has capability and experience to provide assistance during system start up.

1.7 SEQUENCING

- A. Submit short circuit and protective device coordination study to Architect/Engineer prior to receiving final approval of distribution equipment shop drawings and prior to releasing equipment for manufacturing.
- B. When formal completion of study will cause delay in equipment manufacturing, obtain approval from Architect/Engineer for preliminary submittal of study data sufficient in scope to ensure selection of device ratings and characteristics will be satisfactory.

1.8 SCHEDULING

- A. Schedule work to expedite collection of data to ensure completion of study for final approval of distribution equipment shop drawings prior to release of equipment for manufacturing.

1.9 COORDINATION

- A. The professional performing the study shall be responsible for contacting the serving utility company and obtaining all values required for the completion of the overcurrent protective device coordination study.
- B. The professional performing the study shall be responsible for contacting the generator manufacturer and obtaining the manufacturer and trip curves for the circuit breakers being provided with the generator and including the generator circuit breakers in the overcurrent protective device coordination study.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The equipment manufacturer shall provide the services of a qualified field engineer and necessary tools and equipment to test and calibrate the protective relays, ground fault relays and circuit breaker trip devices as recommended by the coordination Study.
- B. Perform field adjustments of protective devices and modifications to equipment to place equipment in final operating condition. Adjust settings in accordance with approved short circuit and protective device coordination study.
- C. Upgrade and modification to equipment characteristics and ratings to be finalized by the results of the Short Circuit and Protective Device Coordination Studies.
- D. Field settings of devices, adjustments, upgrading and modifications to the new equipment to accomplish conformance with the accepted Short Circuit, Protective Device Coordination and Arc Flash Studies, shall be carried out by the equipment manufacturer's representative under the supervision of the Contractor at no additional cost to the District.
- E. Notify District's Representative in writing of any required major equipment modifications.
- F. Provide arc flash labels for all buses as required.
- G. Labels shall be machine printed, with no field markings.
- H. Equipment shall not be energized until the breakers have been set and tested to the pickup levels determined by the approved final power system study.

END OF SECTION

SECTION 26 31 00

PACKAGED PV SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This section shall consist of providing a packaged PV system with battery storage and all accessories as specified and required by the 2022 California Energy Commission Title 24. The equipment supplier must be the authorized distributor for each component of the products specified herein. The work includes the furnishing of all labor, materials, equipment, test, and training to provide a complete and workable solar power generating system, including the PV modules, inverters, battery storage, PV module support system and interconnecting conduit/wire, and specified herein. It is the intent of these specifications to have a single source responsibility for the PV modules, inverter, battery storage and support structure.
- B. Any and all exceptions to the published specifications shall be subject to the approval of the engineer.
- C. The power generating system shall be furnished by a solar integrator (contractor) who shall be responsible for the installation, coordination, and testing of the complete system. The entire system shall be installed as shown on the plans, drawings, and specifications herein.
- D. The equipment shall be produced by a manufacturer who has produced this type of equipment for a period of at least 10 years and who maintains a service organization available twenty-four hours a day throughout the year.
- E. The equipment shall be produced by a manufacturer who is ISO 9001 certified for the design, development, production, installation, and service of the complete product line.
- F. Complete and submit utility company interconnect agreement and required documentation (plans, diagrams, specifications and equipment data sheets) to the serving utility company for approval.
- G. Secure and pay for required permits and approvals from the serving utility company.
- H. Complete and submit utility company, State and local incentive/rebate program applications.
- I. The PV system is a deferred approval item and the sole responsibility of the contractor to submit plans, equipment data sheets, wiring diagrams and calculations to the authority having jurisdiction (AHJ) for review and approval. The PV system submittal to the AHJ shall bear the stamp and signature of a professional engineer registered in the State of California.
- J. Installation of the PV system shall commence upon approval of the PV plans by the AHJ.

1.02 GENERAL REQUIREMENTS

- A. It is the intent of this specification to secure an electrical power generating system that has been tested during design verification, production and at the final job site. All finished equipment shall be of the latest commercial design and will be complete with all of the necessary accessories for complete installation as shown on the plans, drawings, and specifications herein. The equipment supplied and installed shall meet the requirements of

the 2022 California Electrical Code, along with all applicable local codes and regulations. All equipment shall be new and of current production of a national firm that manufactures PV modules, inverters and assembles them as a complete and coordinated system. There will be one source responsibility for warranty, parts, and service through a local representative with factory-trained servicemen.

- B. The electrical power generating system shall be rated 12 kW (STC). System output may range between 19,376 kWh and 20,000 kWh per year.
- C. Battery storage rated power capacity shall be minimum 5.52 kW with rated energy capacity of 20.0kWh.
- D. Refer to Section 260000 for Submittal requirements.

1.03 RELATED DOCUMENTS

- A. The following specification section apply to all work herein:
 - 1. Section 260000 – General Electrical Requirements.

PART 2 - PRODUCTS

2.01 INVERTER:

- A. 208V. 3 phase, transformerless, string inverter with integral AC and DC disconnect switches, DC arc-fault protection, integrated DC fused string combiner, and 96.0% CEC efficiency. As manufactured by Fronius, Primo 10.0-1, or approved equal.

2.02 PV MODULES

- A. Modules shall be as manufactured by Phon Solar, 455W Twinplus Module, or approved equal by the project Electrical Engineer.
- B. Module shall meet UL 1703 requirements, shall carry the CE mark and meet IEC 61215 standards.
- C. Module shall have a 25 year power performance warranty for 80% of warranted minimum power.
- D. Construction:
 - I. Front – Solar glass with anti-reflective surface treatment, 3.2mm (0.13”).
 - II. Back Sheet – Highly resistant polymer (black).
 - III. Frame – Anodized aluminum (black).
- E. The terminal box shall have integral built-in bypass diode protection (to preserve array output power during periods of local shading). The junction box shall be weather resistant, watertight, UV and microbe resistant and meet IEC 61215 edition 2 design. The junction box will have positive and negative, 12 AWG, dual insulated cables with UL listed polarized weatherproof connectors. Connectors will be IP65 designed and meet 2022 CEC standards.
- F. The module manufacturer shall have been in business for more than 20 years with modules operating in the field for more than 20 years.

2.03 BATTERY STORAGE:

- A. Lithium ion batteries in wall mounted enclosure.
- B. Provide quantity of battery cabinets as required to provide 5.52 kW power capacity and 20.0 kWh energy capacity.
- C. Battery system shall be as manufactured by Enphase, Tesla Powerwall or equal.
- D. Refer to Section 140.10 of the California Energy Code for additional battery storage system requirements.

2.04 SUPPORT SYSTEM:

- A. Unirack or equivalent. To be mounted on the Gymnasium building roof.

PART 3 - EXECUTION

- 3.01** Coordinate the assembly of the PV module support system with existing roof drains, vent pipes, structures.
- 3.02** Replace damaged PV modules and modules that are not performing to the manufacturer's specifications with new modules.
- 3.03** Test inverter for compliance with the manufacturer's specifications. Replace damaged or non-performing inverter with new inverter.
- 3.04** Test the battery storage system for compliance with the manufacturer's specifications. Replace damaged or non-performing battery storage system.
- 3.05** Clean all module and inverter surfaces at completion of the project.
- 3.06** Refer to Architectural roof plan for system configuration and Electrical roof plan for PV system equipment locations and wiring connections to the facility power distribution system.

END OF SECTION

SECTION 27 00 00

INTEGRATED COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SCOPE

- A. All applicable portions of Section 26 shall apply to this section as though written herein completely.
- B. Provide a complete and operable expansion of the existing Bogen intercom system including, but not limited to, paging, class pass/program, devices, back-boxes, wire, terminations and required programming to match existing system functions
- C. Provide a complete and operable expansion of the existing computer network (data) system including, but not limited to, outlets, connectors, patch panels, terminal blocks, conduit, wire/cable and required programming to match existing functions.
- D. Provide a complete and operable expansion of the existing Security system including, but not limited to, motion sensors, power supplies, back-boxes, wiring, terminations, conduit, wire/cable and required programming to match existing functions.
- E. The communications systems shall be programmed to meet the School District requirements. The Contractor shall meet with the School District maintenance department and obtain programming criteria prior to programming the system. The system shall be tested in the presence of the School District maintenance department staff prior to completion of the work to ensure compliance with the School District criteria and the Contractor shall make required modifications to the system as required to satisfy the School District's requirements.
- F. The Contractor shall furnish 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 applicable Contract Drawings and/or specified herein. The Contractor shall furnish and install complete systems functioning in compliance with the manufacturer's specifications and the School District requirements.
- G. The Contractor shall provide infrastructure, cable, hardware, and equipment, including hand-sets, to provide a complete and operational communications system. Any material and/or equipment necessary for the proper operation of the system, which is not specified or described herein, shall be deemed part of this Specification.
- H. The Contractor shall visit the site, verify all existing items shown on plans, or specified, and be familiar with the working conditions, hazards, and local requirements involved; submission of bids shall be deemed evidence of such visit. All proposals shall take these existing conditions into consideration before bidding.
- I. The contractor shall schedule a site visit with the School District Maintenance & Operations (M&O) department prior to start of construction to assess the status of the existing systems. The contractor shall submit a pre-construction report to the School District M&O department outlining any deficiencies found during the site visit. The contractor shall obtain direction from the Owner/Architect for remedial work required to repair deficiencies. At the conclusion of the construction phase the system shall function without deficiencies.

- J. At no time during the construction phase when school is in session and when teacher's are on campus shall it be acceptable for the integrated communications system to be inoperable or not serving the buildings connected to the existing system. The contractor shall provide temporary communications between all buildings and rooms within the buildings whenever the system is inoperative or shut-down for any reason. A temporary school wide intercommunications plan to be implemented during system shut-downs or inoperable periods shall be submitted to the School District for approval prior to start of construction. Temporary school wide intercommunications shall at a minimum consist of walky-talkies for all staff members and battery operated self-correcting atomic clocks for all rooms currently provided with system clocks.

1.02 RELATED WORK:

Document affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and 26 of these specifications.

- A. The work described by this part includes the furnishing of all materials, equipment, supplies, labor and the performing of all operations necessary for the installation of complete and operating systems.
- B. All conduits, outlet boxes, back boxes, junction boxes, terminal cabinets, backboards, wiring, cables, equipment, devices, etc., shall be furnished and installed complete under this section. Conduit and junction box sizes shall be determined by the Installing Communications Contractor for the particular wire and cable fills required for the systems installed. (Conduit sizes shall comply with the California Electrical Code). The entire responsibility of the system, including the installation, operation, function, testing and maintenance for one (1) year after final acceptance under this section shall be the responsibility of the communications contractor.
- C. The Installing Communications Contractor shall furnish and install all equipment, cables, devices, and other materials even though not specifically mentioned herein, which are necessary for the proper integration of the system so that the system shall perform the functions listed herein in compliance with all specified requirements.

1.03 GENERAL REQUIREMENTS

- A. The Installing Communications Contractor shall hold a valid State of California C-7 License, shall have completed at least 20 projects of equal scope, shall have been in business of furnishing and installing communication systems of this type for at least five years, and capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.
- B. The Installing Communications/Alarm Contractor shall provide a letter with submittals from the manufacturer of the system, or the major components of the system, to the School District stating that the Communications/Signal Contractor is a certified representative and that manufacturer has a service representative assigned to provide repair and mitigation to the system(s) within a 24 hour time period.
- C. The Installing Communications Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work. Such as Alarm Company and Agent licenses.
- D. The Installing Communications Contractor shall be a factory authorized distributor and warrantee station for the brand of equipment specified and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Installing Communication Contractor shall maintain a spare set of all major parts for the

system at all times. All circuit boards, amplifiers and control sub systems shall be 100% backed up with stock at contractor's shop.

- E. Installing contractor shall be a Berk-Tek Leviton certified installer, and shall provide a limited lifetime application warranty. All products provided and installed by the certified installer shall be of the type and manufacturer required to meet the warranty criteria.

1.04 QUALITY ASSURANCE:

- A. It is the intent of these specifications to establish a standard of quality for labor and material to be installed. The Base Bid shall include materials as specified without exception. For any proposed substitution, complete descriptive, technical and cost comparison data and test reports shall be submitted for review during the bidding period. The Contractor shall reimburse the Architect for any additional engineering charges and shall pay all charges of other trades resulting from substitutions. Proposed substitutions shall be listed on the bid form, stating the reasons for substitution and the amount to be deducted from the bid if the substitution is allowed. Final approval of the alternate system shall be determined at the time of job completion. Failure to provide the "precise functional equivalent" shall result in the removal of the alternate system and installation of the specified system at the contractors expense.
- B. If a substitution item is given final acceptance by the Owner, the contractor shall pay all costs (including travel, lodging, meals, computers, etc....) required to provide factory certification, equal to that of a Factory Authorized Distributor of the substituted item, for two (2) selected Owners representatives. This training shall occur at the primary factory of the substituted item in question and shall allow the selected Owners representatives to provide any and all Factory / Manufacturer approved repairs, services, software upgrades, etc... without affecting any available or applicable Manufacturer Warranties.
- C. All of the Electronic Systems Equipment shall be furnished and installed by the Authorized Factory Distributor of the equipment. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the Installing Communication Contractor is the Authorized Distributor and that the equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they will have a service representative assigned to this area for the life of the equipment.
- D. All communication systems supplied shall be listed by Underwriter's Laboratories under UL Standard 1459. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.
- E. The material in this section will be covered by a five year material warranty policy.

1.05 SUBMITTAL AND MANUALS

- A. Comply with all requirements of the General Conditions, Supplementary Conditions and applicable sections of Divisions 1 and 16 of these specifications.
- B. Additional requirements of this section are:
 - 1. Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit to the Architect for review, eight copies of a complete submission.
 - 2. The submission shall consist of five major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.
 - 3. The first section shall be the "Index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.

4. The second section shall include a copy of the Installing Communication Contractors valid C-10 California State Contractors License, letters of factory authorization and guaranteed service, list of 20 projects of equal scope and list of proposed instrumentation to be used by the Contractor.
 5. The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished next to all of the specified equipment's features and functions as stated in the specifications and data sheets.
 6. The fourth section shall contain an original factory data sheet for every piece of equipment in the specifications.
 7. The fifth section shall contain a wiring designation schedule for each circuit leaving each piece of equipment and drawings showing system wiring plans.
 8. The submittal shall also include, but not be limited to, a site plan indicating site distribution of system wire/cable, floor plans indicating location of equipment, system devices, required wire/cable between equipment and devices, site specific wiring/connection diagrams, equipment rack elevations indicating dimensions and the arrangement/placement of all rack mounted equipment, zoning for alarms and paging and a written description of the system operation and functions.
- C. The Contractor shall provide two copies of an "Operating and Servicing Manual" for the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: Instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system; a wiring destination schedule for each circuit leaving for each piece of equipment; a schematic diagram of major components with all transistor and IC complements and replacement number.

PART 2 - PRODUCTS

2.01 INTERCOM/PAGING SYSTEM

- A. Handset: To match existing. Provide one handset for each office/classroom.
- B. Classroom speakers (ceiling mounted): Atlas #FD72W with back box and baffle.
- C. Exterior speakers (wall mounted): Quam #QM-SYSTEM 6VPS with weatherproof surface mount box, trim plate and grill.
- D. Wire/cable: Provide as recommended by the Intercom system manufacturer. Wire/cable installed outdoors or underground shall be rated for outdoor or underground installations.
- E. Terminal Cabinet - Wire/cables shall be terminated on the terminal blocks designated for paging zones. Terminations will not be allowed on the all-page/emergency paging terminal blocks. Coordinate termination of cables with the School District.
- F. System, including wire/cable, shall be provided, installed and terminated by the low-voltage system contractor.

2.02 SECURITY SYSTEM

- A. Motion Sensors: Dual technology as manufactured by Bosch Security #DS938Z.
- B. Keypad: Two Line alpha numeric type as manufactured by Bosch Security #B920 to match existing.
- C. Wire/cable: Provide as recommended by the Security system manufacturer. Wire/cable installed outdoors or underground shall be rated for outdoor or underground installations.

- D. Terminal Cabinet - Coordinate termination of cables with the School District.
- E. System, including wire/cable, shall be provided, installed and terminated by the low-voltage system contractor.

2.03 DATA/NETWORK SYSTEM:

- A. Provide all necessary labor, equipment and materials for a complete system.
- B. Fiber Optic Cable:
 - 1. Provide fiber optic cable routed between the existing IDF and the new IDF indicated on plan and terminate on a wall mount or rack enclosure. Leave 10' of slack cable at each end.
 - 2. Fiber optic cable optical fibers (50/125) graded index multi-mode 6 strand optical glass fibers for use with, but not limited to ETHERNET, TOKEN RING and FDDI communication systems; potential dual operation at 850nm and 1300nm wave length.
 - 3. WAVE LENGTH MIN. BANDWIDTH MAX. ATTEN.

850nm	160Mhz per KM	3.8dB per KM
1300nm	500Mhz per KM	1.5dB per KM
 - 4. All fibers in a multi-fiber cable shall be fully operational within the performance characteristics specified prior to and after the cable is installed. The use of spare fibers in the cable to compensate for defective fibers is not permitted. Defective cables shall be removed and replaced with fully functional cables at no additional cost to the contract.
 - 5. Cables shall be U.L. listed, complying with National Electrical Code and ETL verified to meet or exceed specified requirements.
 - 6. Provide "SC" type termination connectors at each end of all fiber optic cables. Insertion loss of each mated connector shall be less than 0.3 db.
 - 7. Strain relief boot, long boot type unless indicated otherwise, short or angled boot type to match the connector installation application. Provide dust cover cap for each connector. Connectors shall be manufactured by AMP, SIECOR or equal.
 - 8. All fiber cable will be rated for the space that it is installed. Cables installed in underground conduit will be gel-filled loose tube with rated jacket, etc.
- C. Copper Wire Cable (unshielded twisted pairs):
 - 1. Provide Category 6 (4 pair) cables from each data system outlet indicated on the drawings to each building patch panel.
 - 2. Category 6 cables shall be copper wire, individually insulated and color coded, with an overall non-conductive, with required rated jacket as manufactured by AMP, WEST PENN or AT&T and meet EIA/TIA 568B wiring standard.
 - 3. All cables installed underground will be duct rated for that use.

D. System Outlets:

1. Each wall mounted Data outlet shall be cabled with two (2), 4-pair, category 6, 24 AWG cable. Each cable shall terminate on one RJ45 jack equipped with 110 type terminations, and on the data category 6 patch panels, using 110 type hardware. Data terminations will be allocated to specific termination areas and use colored designation strips.
2. Each ceiling mounted Data outlet shall be cabled with four (4), 4-pair, category 6, 24 AWG cable. Each cable shall terminate on one RJ45 jack equipped with 110 type terminations, and on the data category 6 patch panels, using 110 type hardware. Data terminations will be allocated to specific termination areas and use colored designation strips.
3. Provide faceplates with modular RJ45 jack inserts and blanks for spare spaces on the wall plate. Wall plates shall be fully compatible with the back-boxes.
4. Refer to the plans for actual quantity and location of outlets.

E. Provide the following equipment racks and networking distribution equipment at the buildings indicated on plan:

1. Light guide interconnect unit: Leviton #OPT-X500 preloaded rack mount enclosure. IDF may require multiple units, provide for termination of each fiber conductor.
2. 24"H x 24"D network equipment cabinet with tinted door, racks with cable management systems and mounting hardware. Chatsworth 11900-724 or equal.
3. Leviton #69586 series or equal patch panels as required to terminate each Category 6 data cable indicated on plan.
4. Provide a Category 6 patch cord for each position in use plus 20% spare.

F. Fiber Optic Cable and Copper Wire Cable Installation:

1. Fiber optic and copper wire cables connecting to equipment racks shall be installed with not less than 10 feet of slack cable between the rack and terminal backboard. The slack cable shall be coiled in the light box.
2. Provide 18 inches of cable slack at computer data system outlets.
3. The minimum bending radius for all cables and the maximum pulling tension shall not exceed manufacturers recommendations.
4. Cables installed in man holes 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. Cable pulling shall use a split mesh grip over the cable jacket connection directly to optical fibers and copper wire conductors shall not occur.
7. A dynamometer to measure pulling tension shall be used on all cable runs in excess of 200 feet or more with 180 degrees in bends. The actual pulling tension value shall be calculated and recorded for each pull.
8. Pulling eyes on optical fibers and copper conductor shall not be used.

9. Cable pulling lubricants shall be continuously applied to all cables and be specifically approved by the cable manufacturer.
 10. Where cables are "pulled through" or pulled from a "center of run pull" without splices or terminations leadout the cables at manholes, pullboxes and conduits taking care to feed them in again by hand for the next run.
 11. For each cable pull where a cable direction changes 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.
 12. Separation of individual twisted pair to be no more than .5" from termination point.
- G. Splicing of cables or conductors is not permitted.
- H. All cables, outlets and terminations shall be labeled and designated in accordance with the School District Information System department standards.
- I. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.
- J. Each individual copper wire conductor in all terminated and unterminated cables provided in the contract shall be tested after installation, splicing and termination is completed. Testing shall be done by an independent testing laboratory.
- K. System, including wire/cable, shall be provided, installed and terminated by the low-voltage system contractor in compliance with the School District Information System department standards.
- L. Upon completion of above tests Contractor is to submit a report presenting test results for all measurements. With the report, submit written certification that the installation conforms to specifications. Provide data on 3.5" disks in Microtest format.
- M. Test Parameters:
1. Category 6 cables shall be tested to meet EIA/TIA 568-B.1 and 568-B.2, 250 MHz performance specifications and for continuity, opens, breaks, shorts, and grounds, near end cross-talk, impedance, capacitance, and resistance.
 2. Fiber optic cables shall be tested to meet ANSI/TIA/EIA-526-14A:OFSTP-14A, method "B" and shall be tested at 850 and 1300 nm. Perform OTDR testing per specifications. Provide written results indicating the cables tested within the manufacturer's specifications for optical loss specific to the individual run lengths.
 3. Any fiber optic or UTP cables not meeting EIA Category 6 and 100MHz specifications shall be replaced by the Contractor.
- N. LAN Electronics for Data Network:
1. Provided and installed by the School District IT Department

2.04 CLOCK:

- A. Battery operated, self adjusting atomic clock. American Time & Signal #E56BAND301BP or equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Maximum distance for 50/125 multimode fiber is 1800 feet. Contractor shall verify distances between the existing MDF and the new IDF after the installation of the site distribution conduits is complete and provide the type of fiber cable and termination hardware required to meet the measured distances.
- B. Maximum distance for Cat 6 cable is 300 feet. Contractor shall verify distances between the existing IDF/MDF and the new outlets after the installation of the site distribution conduits is complete and submit the actual cable distances to each outlet indicated on plan to the Architect/Engineer for review. Where Cat 6 cables exceed the 300'-0" length, the contractor shall provide a new IDF in the portable classroom selected by the Architect/Engineer and route a fiber optic cable between the existing IDF and new IDF. The IDF shall be minimum 24"H x 24"D with tinted door, racks with cable management systems, mounting hardware, fiber terminations, hubs, patch panels and patch cords. Fiber optic cable shall be fully compatible with the fiber distribution system on-site.
- C. The contractor shall be responsible for reviewing the plans and specifications to ensure each room, where equipment is to be installed, has sufficient space to accommodate the system cabinets, equipment and terminations while maintaining code mandated clearances about said equipment. The contractor shall identify problem areas prior to bid, include all costs required for corrective measures in his bid and submit alternate equipment and materials suitable for the installation to the Architect/Engineer for acceptance as part of the product submittal process.
- D. All start-up programming and system commissioning shall be performed by a manufacturer's trained and certified technician.
- E. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the architect before making any changes. It shall be the responsibility of the factory authorized distributor of the specified equipment to install the equipment and guarantee the system to operate as per plans and specifications.
- F. Furnish all conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system. All wire/cables shall be terminated and tested.
- G. The cables within the rack or cabinets shall be carefully cabled and laced with ty-raps. All cables shall be numbered for identification.
- H. Splices of conductors in underground pull boxes is not permitted.
- I. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.
- J. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and

free of all dirt, dust, smudges, spots, fingerprints, etc., The contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.

- K. Documentation - Provide the following directly to the Supervisor of Technology Service:
 - 1. Provide a printed copy of all field programming for all components in system.
 - 2. Provide one copy of all service manuals, parts list, and internal wiring diagrams of each component of system.
 - 3. Provide one copy of all field wiring runs, location and end designation of system.
- L. The contractor shall provide not less than eight (8) hours for instruction of personnel in the operation and maintenance of the systems. This instruction time shall be divided as directed by the Owner.

3.02 WARRANTY / GUARANTEE

- A. Guarantee all parts, labor, and workmanship furnished under this contract for the minimum period of twelve months from the date of substantial completion, or first formal use by the Owner, whichever is last to occur. During the warranty period, report to the site and repair or replace any defective materials or workmanship without cost to the Owner. Non-emergency Warranty service shall be rendered within 24 hours after request by the Owner. Emergency service shall be provided within 8 hours of request by owner. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made. Where warranties on individual pieces of equipment exceed twelve months, the guarantee period shall be extended to the warranty period of the particular items.
- B. A typewritten notice shall be posted at the equipment rack which shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.
- C. After completion of the work the Contractor shall submit a Certificate of Warranty, stating commence and expiration dates and conditions of the warranty, for signature of both participating parties. Incremental warranties for completed portions of the work may be negotiated at the discretion of the Owner, if delays occur beyond the control of the Contractor.

3.03 TESTING

- A. Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the frequency response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds. Perform all tests stated in each separate system specification.
- B. The owner reserves the right to make independent tests of all equipment furnished to determine whether or not the equipment complies with the requirements specified herein and to accept or reject any or all of the equipment on the basis of the results thereby obtained.

END OF SECTION

SECTION 27 41 16

GYM AUDIO SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. The work covered in this document consists of furnishing all labor, material and services necessary to install a complete audio visual system as indicated on the project drawings and in these specifications. The A/V system shall be capable of accommodating sporting events and banquet type functions in the Gym.
2. The Contractor shall provide all labor, engineering, programming, design, testing, materials, components and supervision necessary to provide a complete operating Audio Video Control System.

1.2 REFERENCES

- A. National Electrical Manufacturer's Association (NEMA)
- B. American National Standards Institute (ANSI)
- C. National Electric Code (NEC)
- D. Relevant State Electric and Fire Codes
- E. Institute of Electrical and Electronic Engineers (IEEE)
- F. Underwriters Laboratories, Inc. (UL)
- G. ANSI/EIA/TIA 568A-1995 Commercial Building Telecommunications Wiring Standard
- H. ANSI/EIA/TIA 568-B.2-1 Transmission Performance Category 6 Cabling Specifications for 4-Pair 100 Ohm.
- I. ANSI/EIA/TIA 569A Commercial Building Standard for Telecommunications Pathways and Spaces.
- J. ANSI/EIA/TIA 606 the Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
- K. ANSI/EIA/TIA 607 Commercial Building Grounding and Bonding Requirements for Telecommunications
- L. EIA/TIA TSB 67 Transmission Performance Specifications for Field Testing of Unshielded Twisted-Pair Cabling System
- M. Building Industry Consulting Service International (BICSI) publications:
 1. Telecommunications Distribution Methods Manual
 2. Telecommunications Cabling Installation Manual
- N. Manufacturer's recommendations and installation guidelines.
- O. All cabling shall comply with all appropriate requirements of CEC Articles 770 and 800 and shall comply with the State Fire Codes as interpreted by the State Fire Marshall's Dept.
- P. All publications referred to in this document shall be the latest edition thereof together with any amendments and/or addenda current ten days before the date fixed for return of bids.

1.3 SUBMITTALS

A. Certificates

1. Contractor shall hold and maintain manufacturer's certification for the Audio/visual system.
2. The contractor must be certified with the manufacturer for the Audiovisual system for at least twelve (12) months prior to bid.
3. The Contractor shall provide proof of certification to the School District.

B. Qualifications

1. Provide Contractor's experience and qualifications, which shall include three (3) years of projects of similar complexity. Include names and locations of two projects successfully completed using an instructional classroom technology.
2. Provide documentation indicating Contractor has been in the telecommunication contracting business for a minimum of five (5) years under the same name and are located within a two hundred (50) miles of the School District.

C. Calculations & Design Analysis

1. Calculations: power load of PA system shall be calculated by the Installer on a separate sheet and shall be included in submittal.
2. Design Analysis: Installer shall submit an electro-acoustical design analysis for review. Provide scale drawings indicating plans and sections of the auditorium along with an elevation of the cluster. One drawing shall indicate contours with the maximum predicted sound pressure level for the 1 KHz octave with a band limited pink noise test signal. Another drawing shall indicate the calculated area within which the specified electro-acoustic frequency response may be maintained for the first arrival sound from the cluster. Submit the name and the organizational affiliation for the individuals responsible for performing the electro-acoustical design analysis. Submit evidence, including appropriate certificates that these individuals are trained in the specified molding application. The design shall be generated by or based upon the output of a Computer Aided Electro-Acoustical Design Program such as Ease, Acousta CADD, Bose Modeler, array SHOW, CATT, JBL CADP2 or MAPP Online Pro.

D. Shop Drawings:

1. Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit to the Architect for review, eight copies of a complete submission.
2. The submission shall consist of five major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.
3. The first section shall be the "Index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.
4. The second section shall include a copy of the Installing Contractor's valid C-7 California State Contractors License, letters of factory authorization and guaranteed service, list of 20 projects of equal scope and list of proposed instrumentation to be used by the Contractor.
5. The third section shall contain original factory data sheets for every piece of equipment in the specifications and current model numbers. Obsolete or discontinued equipment shall be removed from the submittal and replaced with the current/equivalent model for the specified equipment.

- 6. The fourth section shall contain the calculations required per Item 1.3.C above.
 - 7. The fifth section shall consist of plans and drawings indicating the sequence of operation, symbol list, conduit and wire schedule, manufacturer's installation details, audio, video and audio-video wall plate configurations, site specific wiring diagram of the system indicating all system components and required interconnecting wiring, equipment rack elevation indicating the placement of the rack mounted system components,.
 - 8. The DSA Approved plans shall not be copied and submitted as shop drawings. Shop drawings shall be submitted using the Contractor's Title Block. Equipment, devices and Plan/Key notes not pertaining to the sound system shall be removed from the plans.
- E. Submittals that include equipment data sheets but no plan drawings and site specific wiring diagrams shall be considered incomplete, and shall be returned to the Contractor for re-submittal.
 - F. Refer to Section 01 33 00 for Additional Requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Documentation to be submitted upon completion of system are:
 - 1. Upon completion of installation, the contractor shall prepare "as built" drawings of the system. As built shall be of each floor plan indicating exact device locations, panels, cable routes and wire numbers as tagged.
 - 2. Provide Electronic copies of "as built" in AutoCad and PDF formats.
 - 3. Maintenance required and maintenance schedule.
 - 4. Provide a list of IP address, MAC address and location.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. 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.

1.6 WARRANTY

- A. The Contractor shall provide manufacturer's warranty that any equipment installed under this specification shall be free from defect for a period of five (5) years from the date of final acceptance.
- B. The Contractor shall warrant the workmanship and installation of the system for one (1) years.
- C. During the warranty period, the Contractor shall provide the District with the manufacturer toll-free hotline and support center to assist the District to service the specified product.
- D. During the warranty period, the Contractor shall maintain adequate stock of potential replacement parts to service the system should component failure occur.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND SYSTEMS DESCRIPTION

- A. Components
 - 1. Professional CD player with Bluetooth Receiver by Tascam Model # CD-200BT or approved equal.
 - 2. Storage drawer by Middle Atlantic Model # D2 or approved equal.

3. Blank panel – Middle Atlantic # SB1 – Fill in all open spaces with blank panels or approved equal.
 4. Vented panel – Middle Atlantic # VT1 –Provide vented panels above and below amplifier or approved equal.
- B. Center Cluster Bracket
1. Shall be a Hexagon shape in center of Gym
 2. Shall be installed with 36" GridLink Beams
 3. QTY-6 SAS-036-RB
 4. QTY-6 SAS-100-CA
 5. QTY-6 SAS-EB-KT
 6. QTY-6 SAS-GL
- C. Power Amplifiers for the speakers
1. Power Output - 550W @ 8 ohms per channel. For center cluster
 2. Power Output - 1100W @ 4 ohms per channel. For front wall speakers
 3. Frequency Range – 20Hz to 20kHz, 0.05% THD.
 4. QTY-1 QSC CX1102 or approved equal.
 5. QTY-3 QSC CX902 or approved equal.
- D. Provide front wall speakers
1. Speakers shall be supported with SuperSam wall mount
 2. Frequency Range – 100Hz to 14kHz, at -3db
 3. Frequency Range – 70Hz to 16kHz, at -10db
 4. QTY-2 EV SX600PI or approved equal.
- E. Provide center cluster speakers
1. Speakers shall be supported with MB5B U-Bracket from GridLink center cluster bracket
 2. Frequency Range – 58Hz to 18kHz, at -3db
 3. Frequency Range – 39Hz to 20000Hz, at -10db
 4. 60x60 throw pattern
 5. QTY-6 EV ZX5-60B or approved equal.
- F. Audio Signal Processor
1. DSP 16 inputs and 16 outputs
 2. Leveling, Limiting, Compression, Ducking, ANC. And soft Gating of signals
 3. Line Voltage: 100 VAC - 240 VAC 50-60 Hz
 4. RS232: Male 9-pin D shell connector (DE-9)
 5. Network Channel Capacity: 256 X 256
 6. Input Cards: QTY-4 QSC CIML4
 7. Output Cards: QTY-4 4 QSC COL4
 8. QTY-1 QSC core 510i or approved equal.
 9. QTY-1 TSC 70 G3 located in Rack

- G. Power Distributor Strip
 - 1. Surge and spike protection.
 - 2. Front illuminated switch/circuit breaker.
 - 3. Middle Atlantic # PD-915R or approved equal.
- H. Provide wireless microphone system consisting of the following:
 - 1. Full featured UHF Systems.
 - 2. Remote antennas mounted in center of GYM
 - 3. Shure QLXD24/SM58 / system with rack mount kit or approved equal.
 - 4. Qty-4
- I. Assistive Listing System System Consisting Of The Following:
 - 1. Hearing Assistance System: Provide FM hearing assistance system. Base station shall be mounted inside the amplifier cabinet. The base station shall operate in 72 MHz-76 MHz band and shall be furnished with remote-mounted antenna to cover a minimum of 1000 feet.
 - 2. QTY-1 FM 558 PRO from William Sound, or approved equal with minimum thirty-six (36) standard receivers (4% of occupancy) and nine (9) hearing-aid compatible receivers (25% of standard receivers).
- J. Microphones
 - 1. Provide neodymium dynamic, super-cardioid microphones with frequency response of 70 to 15 kHz.
 - 2. Microphone shall have on-off switch with lock "on" feature and adjustable swivel adapter.
 - 3. QTY-2 SM58S or approved equal
 - 4. Provide Microphone Stands with boom.
 - 5. All microphone cable shall be a minimum of 18 AWG.
 - 6. Microphone cable below grade shall be West Penn #TC1803S or District approved equal 600 volt, 18AWG outdoor rated, 3-pair cable (one pair is spare) with individual pair shields and 100% overall shield. 2.8.6 Microphone Cables: 25'-0" long, 20 ga., with braided shield cable assemblies.
- K. Wire
 - 1. Speaker Level wire shall be 12/2 West Penn 227
 - 2. Line Level signals shall be 22/2 West Penn 291

PART 3 - EXECUTION

3.01 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.

3.02 INSTALLATION

- A. Integrator 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 Integrator with demonstrated experience in projects of similar size and complexity.
- E. Equipment shall be configured and in ready to use condition at the end of installation. Energize and commission equipment in accordance with manufacturer's instructions. Commissioning the system shall at minimum, consist of the following:

3.3 CLEANING

- A. 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.

3.4 CLOSEOUT ACTIVITIES

- A. Training
 - 1. The Contractor shall provide a minimum of 10 hours training for the school district personnel on proper operating procedures for the system after completion per campus. This will include a follow up "advanced" training no later than three (3) Months after initial training up to four (2) separate site visits.
 - 2. Initial Training will cover use of GYM sound system. In addition, Contractor is required in initial training to provide instruction to District personnel on all sound functionality.

END OF SECTION

SECTION 28 31 00

VOICE EVACUATION FIRE ALARM SYSTEM

PART 1: GENERAL

1.1 SCOPE

This specification document provides the requirements for the installation, programming and configuration of a complete IntelliKnight 6820EVS digital protocol addressable fire alarm system. This system shall include, but not be limited to, system cabinet, power supply, built in Signaling Line Circuit (SLC), 80 character LCD annunciator, six programmable Flexput circuits, built-in dual line digital communicator associated peripheral devices, batteries, wiring, conduit and other relevant components and accessories required to furnish a complete and operational life safety system.

The scope of work includes disconnecting and removing existing fire alarm system devices, equipment and wire/cabling.

1.2 WORK INCLUDED

1.2.1 General Requirements

The contractor shall furnish and install a complete 24 VDC, electrically supervised, analog addressable fire alarm system as specified herein and indicated on the drawings. The system shall include but not be limited to all control panels, power supplies, initiating devices, audible and visual notification appliances, alarm devices, and all accessories required to provide a complete operating fire alarm system.

At no time during the construction phase shall it be acceptable for the existing fire alarm system to be inoperable or not protecting the buildings connected to the fire alarm system. The contractor shall provide a 24 hours per day, seven days per week firewatch whenever the system is inoperative or shut-down for any reason. A firewatch plan to be implemented during system shut-downs or inoperable periods shall be submitted to the School District for approval prior to start of the installation of the new 6820EVS system.

1.2.2 Listings

All fire alarm system equipment shall be listed for its intended purpose and be compatibility listed to assure the integrity of the complete system.

1.3 STANDARDS

The fire alarm equipment and installation shall comply with the current provisions of the following standards and shall be listed for its intended purpose and be compatibility listed to insure integrity of the complete system.

1.3.1 Codes

2022 California Building Code, Part 2, Title 24.
2022 California Electrical Code, Part 3, Title 24.
2022 California Mechanical Code, Part 4, Title 24.
2022 California Fire Code, Part 9, Title 24.

2022 California Building Standards Administrative Code, Part 1, Title 24, California Code of Regulations (CCR).
Public Safety, Title 19, C.C.R. State Fire Marshal regulations.

- 1.3.2 National Fire Protection Association Standards:
 - NFPA 70 National Electrical Code
 - NFPA 72 National Fire Alarm Code

- 1.3.3 Local and State Building Codes

BOCA, National Building Code, Mechanical Code, Fire Prevention Code

- 1.3.4 Local Authorities Having Jurisdiction

- 1.3.5 Underwriters Laboratories Inc.

All equipment shall be approved by Underwriters Laboratories, Inc. for its intended purpose, listed as power limited by Underwriters Laboratories, Inc., for the following standards as applicable:

- UL 864 UOJZ Control units for Fire Protective Signaling Systems
 - Local Signaling Unit
 - Central Station Signaling Protected Premises Unit
 - Remote Signaling Protected Premises Unit.
 - Water Deluge Releasing Unit
- UL 268 Smoke Detectors for Fire Protective Signaling systems.
- UL 268A Smoke Detectors for duct applications
- UL 521 Heat Detectors for Fire Protective Signaling systems.
- UL 464 Audible Signaling appliances
- UL 1638 Visual Signaling appliances
- UL 38 Manually Activated Signaling Boxes
- UL 346 Waterflow indicators for Fire Protective Signaling systems.
- UL 1481 Power Supplies for Fire Protective Signaling systems.
- UL 2572 Control and Communication Units for Mass Notification Systems

- 1.3.6 Americans with Disabilities Act (ADA)

All visual Notification appliances and manual pull stations shall comply with the requirements of the Americans with Disabilities Act.

1.4 GENERAL REQUIREMENTS

- 1.4.1 Manufacturers/Distributors Services

The following supervision shall be provided by a factory trained service technician from the distributor of the fire alarm equipment. The technician shall be trained and shall have a minimum of two (2) years of service experience in the fire alarm industry. The technician's name shall appear on equipment submittals and a copy of his manufacturer's training shall be sent to the project engineer. The technician shall be responsible for the following items:

- a. A pre installation visit to the job site to review equipment submittals and to verify the method by which the system is to be wired.
- b. During the installation the certified technician shall be on site or make periodic visits to verify installation and wiring of the system. They shall also supervise the

completion of conduit rough, wires pulled into conduit and wiring rough, and ready for trim.

- c. Upon completion of wiring, final checkout and certification of the system shall be made under the supervision of this technician.
- d. At the time of the formal checkout, technician shall give operational instructions to the owner and or his representative on the system.

1.4.2 Submittals

- A. Comply with all requirements of the General Conditions, Supplementary Conditions and applicable sections of Divisions 1 and 16 of these specifications.
- B. Additional requirements of this section are:
 - 1. Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit to the Architect for review, eight copies of a complete submission.
 - 2. The submission shall consist of five major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.
 - 3. The first section shall be the "Index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.
 - 4. The second section shall include a copy of the Installing Fire Alarm Contractor's valid C-10 and C-7 California State Contractors License, letters of factory authorization and guaranteed service, list of 20 projects of equal scope and list of proposed instrumentation to be used by the Contractor.
 - 5. The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished next to all of the specified equipment's features and functions as stated in the specifications and data sheets.
 - 6. The fourth section shall contain an original factory data sheet for every piece of equipment in the specifications and current CSFM listings.
 - 7. The fifth section shall contain voltage drop calculations for each circuit, dB loss calculations for the speaker circuits, battery calculations for the voice evacuation panel and voice evacuation expander panel, sequence of operation, manufacturer's installation details, system/device manufacturer's wiring diagrams, floor plans and site plan indicating equipment/device locations and interconnecting wiring.
 - 8. The DSA Approved plans shall not be copied and submitted as shop drawings. Shop drawings shall be submitted using the Contractor's Title Block, shall include the system manufacturer's installation and wiring diagrams, and site specific plans indicating the interconnecting wiring with relevant plan/key notes. Plan/Key notes not pertaining to the fire alarm system shall be removed from the plans.
- C. Submittals that include equipment data sheets but no plan drawings and site specific wiring diagrams shall be considered incomplete, will not be reviewed, and shall be returned to the Contractor for re-submittal.

D. The Contractor shall provide two copies of an "Operating and Servicing Manual" for the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: Instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system; a wiring destination schedule for each circuit leaving for each piece of equipment; a schematic diagram of major components with all transistor and IC complements and replacement number.

1.4.2 Contract Close-Out Submittals

Deliver two (2) copies of the following to the owner's representative within thirty (30) days of system acceptance. The closeout submittals shall include:

- 1- Installation and programming manuals for the installed life safety system.
- 2- Point to point diagrams of the entire life safety system as installed. This shall include all connected smoke detectors and addressable field modules.
- 3- All drawings must reflect device address as verified in the presence of the engineer and/or end user.

1.4.3 Warranty

All materials, installation and workmanship shall have a warranty for a three (3) year period, unless otherwise specified. A copy of the manufacturer warranty shall be provided with the close out documentation.

1.4.4 Products

This life safety system specification must be conformed to in its entirety to ensure that the installed and programmed life safety system will accommodate all of the requirements and operations required by the building owner. Any specified item or operational feature not specifically addressed prior to the bid date will be required to be met without exception.

No substitutions will be permitted. The specified system is of the same manufacturer as the existing fire alarm system and must be fully compatible with the existing system.

1.4.5 General Equipment and Materials Requirements

All equipment furnished for this project shall be new and unused. All components shall be designed for uninterrupted duty. All equipment, materials, accessories, devices and other facilities covered by this specification or noted on the contract drawings and installation specification shall be best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided under this specification is provided by different manufacturers, then that equipment shall be "Listed" as to its compatibility by Underwriters Laboratories (UL), if such compatibility is required by UL standards.

1.4.6 Satisfying the Entire Intent of these Specifications

It is the contractor's responsibility to meet the entire intent of these specifications.

Deviations from the specified items shall be at the risk of the contractor until the date of final acceptance by the architect, engineer, and owner's representative.

All costs for removal, relocation, or replacement of a substituted item shall be at the risk of the electrical contractor.

PART 2: SPECIFICATIONS

2.1 General

2.1.1 Control Panel

Control Panel with Emergency Voice System

The fire alarm control panel (FACP) shall be the Silent Knight 6820EVS analog addressable control panel. The audio amplifiers shall be the Silent Knight EVS-50W and EVS-100W voice evacuation units. The FACP must have a 6 amp power supply and be capable of expansion to a maximum of 54 total amps via bus connected expander modules that supervise low battery, loss of AC and loss of communication.

The system must contain at one Silent Knight EVS-50W and one EVS-100W watt amplifier and shall be expandable up to 500 watts utilizing up to four additional amplifiers. Each amplifier shall be capable of adding a 4 zone splitter (Silent Knight EVS-CE4) to distribute the audio information to different locations in the installation. The system shall have the capability of controlling up to 40 notification zones. The amplifiers must contain the capability of being remotely located through a four-wire SBUS communications circuit and a two-wire VBUS circuit. The system shall have the capability of adding up to four EVS-RCU remote command units.

The voice evacuation system must have the capability of downloading 15 to 60 second messages and utilize DSP technology for higher audio intelligibility.

The voice evacuation system shall be capable of operating at 25vrms or 70.7vrms, must be field selectable at the amplifier level. Systems that require additional modules for voltage conversion shall not be accepted.

The main panel will contain one SLC circuit with the option of utilizing up to three 5815XL expander modules. Each SLC circuit shall support up to 99 detectors and 99 modules. The communication protocol on the SLC loop must be digital.

The FACP must support a minimum of six programmable Flexput circuits. The panel must have a built in 80 character LCD annunciator with the capability of having an additional eight supervised remote annunciators connected in the field.

The FACP must have a built-in UL approved digital communicator. The communicator must allow local and remote up/downloading of system operating options, event history, and detector sensitivity data.

The FACP must automatically test the smoke detectors in compliance with NFPA standards to ensure that they are within listed sensitivity parameters and be listed with Underwriters Laboratories for this purpose.

The FACP must compensate for the accumulation of contaminants that affect detector sensitivity. The FACP must have day/night sensitivity adjustments, maintenance alert feature (differentiated from trouble condition), detector sensitivity selection, auto-programming mode (Jumpstart) and the ability to upgrade the core operating software on site or over the telephone.

The FACP must have maintenance alert feature (differentiated from trouble condition) and a calibration trouble condition.

The FACP shall have a Jumpstart feature that can automatically enroll all properly connected accessories into a functional system within 60 seconds of powering up the panel. Panels that do not have these capabilities will not be accepted.

The main communication bus (SBUS RS485) shall be capable of class A or class B configuration with a total bus length of 6,000 feet.

2.1.2 System Wiring

The Signaling Line Circuit (SLC) and data communication bus (SBUS) shall be wired with standard NEC 760 compliant wiring. No twisted, shielded or mid-capacitance wiring is required for standard installations. All FACP screw terminals shall be capable of accepting 14-18 AWG wire. All system wiring shall be in accordance with the requirements of NFPA 70, the National Electrical Code (NEC) and also comply with article 760 of the NEC.

2.1.3 Signaling Line Circuits

Each SLC shall be capable of a wiring distance of 10,000 feet from the SLC driver module (5815XL) and be capable of supporting 99 detectors and 99 addressable module devices. The communication protocol to SLC devices must be digital. Any SLC loop device which goes into alarm must interrupt the polling cycle for priority response from the FACP. The FACP must respond consistently to a device that goes into alarm on an SLC within 10 seconds. The auxiliary 5815XL SLC loop module must be capable of being located up to 6000 feet from the FACP on the SBUS, which is separate from the SLC circuit. The SLC shall be capable of functioning in a Class A or Class B configuration.

2.1.4 SLC Loop Devices

Devices supported must include addressable photoelectric and ionization smoke detectors, addressable carbon monoxide detectors, addressable heat detectors, addressable input modules, relay output modules or addressable notification modules. There is to be no limit to the number of any particular device type up to the maximum of 99 detectors and 99 addressable modules that can be connected to the SLC.

2.1.5 Addressable Detector Functions

The products of combustion detectors must communicate analog values using a digital protocol to the control panel for the following functions:

- Automatic compliance with NFPA 72 standards for detector sensitivity testing

- Drift compensation to assure detector is operating correctly

- Maintenance alert when a detector nears the trouble condition

- Trouble alert when a detector is out of tolerance

- Alert control panel of analog values that indicate fire.

2.1.6 Programmable Flexputs

The FACP shall support six (6) programmable Flexput circuits that are capable of being programmed as supervised reverse polarity notification circuits or supervised auxiliary power circuits that can be programmed as continuous, resettable or door holder power. The circuits shall also be programmable as input circuits in Class A or Class B configurations to support dry contact or compatible two wire smoke detectors.

2.1.7 Addressable Notification Module

The contractor shall furnish and install where indicated on the plans, addressable notification modules, Silent Knight model SK-Control. The modules shall be U.L. listed compatible with Silent Knight's 6820EVS fire alarm control panel. The notification module must provide one Class A or Class B notification output with one auxiliary power input. The notification module must be suitable for mounting in a standard 4 inch square electrical box and must include a plastic cover plate. The notification module must provide an LED that is visible from the outside of the cover plate. The notification module must be fully programmable for such applications as required by the installation. The SK-Control shall reside on the SLC loop and can be placed up to 10,000 feet from the control or SLC loop module.

2.1.8 Annunciators

The main control must have a built in annunciator with an 80-character LCD display and feature LED's for General Alarm, Supervisory, System Trouble, System Silence and Power. When in the normal condition the LCD shall display time and date based on a 200 year clock which is capable of automatic daylight savings time adjustments. All controls and programming keys are silicone mechanical type with tactile and audible feedback. Keys have a travel of .040 inches. No membrane style buttons will be permissible. The annunciator must be able to silence and reset alarms through the use of a keypad entered code or by using a firefighter's key. The annunciators must have twenty levels of user codes that will allow the limitation of operating system programming to authorized individuals.

2.1.8 Remote Annunciators

The fire system shall be capable of supporting up to eight (8) remote LCD annunciators, Model 5860. LCD remote annunciators shall have the same control and display layout so that they match identically the built-in annunciator. LED remote annunciators shall have individually mapped LED's and reset and silence inputs. The reset and silence inputs must use the same firefighter's key as the LCD annunciators. Remote annunciators shall be capable of operating at a distance of 6000 feet from the main control panel on unshielded, non-twisted cable.

2.1.9 I/O Module

The fire system shall be able to support up to eight (8) I/O modules, Model 5880, which shall be used to drive remote LED graphic style displays and accommodate up to eight dry contact type switch inputs. The I/O modules shall each drive up to 40 LEDs without requiring external power connections. The I/O module inputs shall be supervised and be suitable for alarm and trouble circuits as well as reset and silence switches.

2.1.10 Serial/Parallel Interface

The fire system shall be capable of supporting up to two (2) serial / parallel interface modules, Model 5824, that are capable of driving standard computer style printers. The interface shall be programmable as to what information is sent to it and shall include the ability to print out detector status by point, event history by point and system programming.

2.1.12 Distributed Power Modules

The contractor shall supply (where required) a power module, Model RPS-1000, compatible with the 6820EVS fire alarm control panel. The power module must have 6 amps of output power, six (6) Flexput circuits rated at 3 amps each, and two form C relay circuits rated at 2.5 amps at 24 volts DC. The six Flexput circuits shall have the same functionality as the Flexput circuits on the main panel. The RPS-1000 shall be capable of being connected via the SBUS at a maximum distance of 6000 feet from the main control panel. The power module shall contain an additional

SBUS that is completely compatible with all 6820EVS add-on modules including remote annunciators, serial/parallel modules and addressable devices. The power module will also act as a bus repeater so that additional SBUS devices can be connected at a maximum distance of 6000 feet from the power module.

The 6820EVS shall be capable of supporting up to eight (8) of the distributed power modules in any combination.

The power module's SBUS bus shall be electrically isolated providing ground loop isolation and transient protection.

2.1.13 Digital Communicator

The digital communicator must be an integral part of the control panel and be capable of reporting all zones or points of alarm, supervisory, and trouble as well as all system status information such as loss of AC, low battery, ground fault, loss of supervision to any remote devices with individual and distinct messages to a central station or remote station. The communicator must also be capable of up/downloading of all system programming options, event history and sensitivity compliance information to a PC on site or at a remote location.

The communicator shall have an answering machine bypass feature that will allow the panel to respond to communication even on phone lines that have other communication equipment present. The communicator must be capable of reporting via SIA and Contact ID formats. The communicator shall have a delayed AC loss report function which will provide a programmable report delay plus a 10-25 min random component to help ease traffic to the central station during a power outage. No controls that use external modems for remote programming and diagnostics shall be accepted.

2.1.14 Dry Contacts

The FACP will have three form "C" dry contacts, one will be dedicated to trouble conditions, the other two will be programmable for alarm, trouble, sprinkler supervisory, notification, pre-alarm, waterflow, manual pull, zone aux. 1 or zone aux. 2. The trouble contact shall be normal in an electrically energized state so that any total power loss (AC and backup) will cause a trouble condition. In the event that the microprocessor on the FACP fails, the trouble contacts shall also indicate a trouble condition.

2.1.15 Ground Fault Detection

There is a ground fault detection circuit to detect positive and negative grounds on all field wiring. The ground fault detection shall operate the general trouble devices as specified but shall not cause an alarm to be sounded. Ground fault will not interfere with the normal operation, such as alarm, or other trouble conditions.

2.1.16 Overcurrent Protection

All low voltage circuits will be protected by microprocessor controlled power limiting or self restoring poly switches for the following: smoke detector power, main power supply, indicating appliance circuits, battery standby power and auxiliary output.

2.1.17 Test Functions

A Lamp Test mode shall be a standard feature of the fire alarm control panel and shall test all LED's and the LCD display on the main panel and remote annunciators.

A Walk Test mode shall be a standard feature of the fire alarm control panel. The walk test feature shall function so that each alarm input tested will operate the associated notification appliances for six seconds. The FACP will then automatically perform a reset operation and confirm normal device operation. The event memory shall contain the information on the point tested.

A Fire Drill mode shall allow the manual testing of the fire alarm system notification circuits. The Fire Drill shall be capable of being controlled at the main annunciator, remote annunciators and a remote contact input.

A bypass mode shall allow for any point or NAC circuit to be bypassed without effecting the operation of the total fire alarm system.

2.1.18 Remote Input Capabilities

The control panel shall have provisions for supervised switch inputs for the purpose of alarm reset and alarm and trouble restore.

2.1.19 Notification Appliance Mapping Structure

All notification circuits and modules shall be programmable via a mapping structure that allows for a maximum of 250 output groups. Each of these groups shall have the ability to be triggered by any of the panel's 125 zones. A zone may trigger groups individually or may contain a global trigger for manual pull stations, fire drills and two different system alarms. Additionally, each zone will individually control the cadence pattern of each of the groups that it is "mapped" to so that sounders can indicate a variety of conditions. The zone shall be capable of issuing a different cadence pattern for each of the groups under its control. The mapping structure must also allow a group to be designated to "ignore cadence" for use with strobes and other continuous input devices. Zones shall have eight different output categories; Detector Alarm, Trouble, Supervisory, Pre-Alarm, Waterflow, Manual pull, Zone Auxiliary 1 and Zone Auxiliary 2. Each of the categories shall have the ability to control from 1 to 8 output groups with a cadence pattern. The patterns are; March Code, ANSI S-3.41, Single Stroke Bell Temporal, California Code, Zone 1 Coded, Zone 2 Coded, Zone 3 Coded, Zone 4 Coded, Zone 5 Coded, Zone 6 Coded, Zone 7 Coded, Zone 8 Coded, Custom Output Pattern 1, Custom Output Pattern 2, Custom Output Pattern 3, Custom Output Pattern 4, Constant, ANSI 4 Temporal, Amseco Synchronization, Faraday Synchronization, Gentex Synchronization, System Sensor Synchronization and Wheelock Synchronization. This mapping/cadence pattern shall be supported by all system power supplies and notification expander modules.

2.1.20 On-Board Programmer

The FACP shall have an on board programmer which will allow for all system functions and options to be programmed via the on board annunciator keypad. Any panel that does not have this capability will not be accepted.

2.1.21 Downloading Software

The fire alarm control panel must support up/downloading of system programming from a PC under Windows XP, Windows Vista, or Windows 7. The FACP must also be able to download the detector sensitivity test results and a 1000 event system event buffer to the PC. Communication shall take place over a direct connection to the PC and/or via the same telephone lines as the built in digital communicator and shall not require an external modem to be connected to the panel. The downloading software shall contain a code that will block unauthorized persons from accessing the panel via direct connection or over the phone lines.

2.1.22 Facility Management Software

The FACP must support facility management software capable of providing off site access to FACP data that is necessary to manage fire system operation. A software package capable of uploading the detector sensitivity test results and the 1000 event system event buffer to the PC shall be required as part of the bid package. Communication shall take place over a direct connection to the PC and/or via the same telephone lines as the built in digital communicator. The facility management package must be separate from the downloading package and must not be capable of affecting programmed system options.

2.1.23 English Language Descriptions

The FACP shall provide the ability to have a text description of each system device, input zone and output group on the system. The use of individual lights to provide descriptions will not be acceptable.

2.2 SYSTEM OPERATION

2.2.1 Alarms

When a device indicates any alarm condition, the control panel must respond within 10 seconds. The general Alarm or Supervisory alarm LED on the annunciator(s) should light and the LCD should prompt the user as to the number of current events. The alarm information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators.

When the alarmed device is restored to normal, the control panel shall be required to be manually reset to clear the alarm condition, except that the alarms may be silenced as programmed.

An alarm shall be silenced by a code or firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur (subsequent alarm feature). When alarms are silenced the Silenced LED on the control panel, and on any remote annunciators, shall remain lit until the alarmed device is returned to normal.

2.2.2 Troubles

When a device indicates a trouble condition, the control panel Trouble LED on the annunciator(s) should light and the LCD should prompt the user as to the number of current events. The trouble information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators.

When the device in trouble is restored to normal, the control panel shall be automatically reset. The trouble restore information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators. A trouble shall be silenced by a code or firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur.

2.2.3 Supervision Methods

Each SLC loop shall be electrically supervised for opens and ground faults in the circuit wiring, and shall be so arranged that a fault condition on any loop will not cause an alarm to sound.

Additionally, every addressable device connected to the SLC will be supervised and individually identified if in a fault condition. The occurrence of any fault will light a Trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.

Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.

PART 3: SYSTEM COMPONENTS

3.0 CONTROL UNIT

3.1 SYSTEM CABINET MOUNTING

The system cabinet shall be red and surface mounted. The cabinet door shall be easily removable to facilitate installation and service.

3.2 AUDIBLE SYSTEM TROUBLE SOUNDER

An audible system trouble sounder shall be an integral part of the control unit. Provisions shall also be provided for an optional supervised remote trouble signal.

3.3 POWER SUPPLY AND CHARGER:

The entire system shall operate on 24 VDC, filtered switch mode power supply with the rated current available of 6 Amps. The FACP must have a battery charging circuit capable of complying with the following requirements:

Twenty-four (24) hours of battery standby with fifteen (15) minutes of alarm signaling at the end of this twenty-four (24) hour period using rechargeable batteries with automatic charger to maintain gel-cell batteries in a fully charged condition.

The power supply shall comply with U.L. Standard 864 for power limiting.

The FACP will indicate a trouble condition if there is a loss of AC power or if the batteries are missing or of insufficient capacity to support proper system operation in the event of AC failure. A battery test will be performed automatically every minute to check the integrity of the batteries. The test must disconnect the batteries from the charging circuit and place a load on the battery to verify the battery condition.

In the event that it is necessary to provide additional power one or more of the model RPS-1000 distributed power modules shall be used to accomplish this purpose.

3.4 CONNECTIONS AND CIRCUITS

Connections to the light and power service shall be on a dedicated branch circuit in accordance with the National Fire Alarm Code NFPA 72, National Electrical Code (NEC) NFPA 70, and the local authority having jurisdiction (AHJ). The circuit and connections shall be mechanically protected.

A circuit disconnecting means shall be accessible only to authorized personnel and shall be clearly marked "FIRE ALARM CIRCUIT CONTROL".

PART 4: ACCESSORY COMPONENTS

4.1 THE FACP SHALL SUPPORT THE FOLLOWING DEVICES ON THE SBUS:

5815XL	Signaling Line Circuit Expander (SLC) Module
5824	Printer Interface Module
EVS-VCM	Voice Control Module
EVS-SW24	Additional 24 Zone Switch Module
EVS-50W	50 Watt Amplifier (4 max.)
EVS-100W	100 Watt Amplifier (5 max.)
EVS-CE4	4 Zone Splitter
EVS-RVM	Remote Microphone (4 max.)
5860	LCD Remote Annunciator
5865-3	LED Remote Annunciator
5865-4	LED Remote Annunciator with reset and silence switches
5880	LED I/O module
5895XL	Intelligent Distributed Power Module
5496	Intelligent Remote Power Supply 6.0 Amp

4.2 THE FACP SHALL SUPPORT THE OPERATION OF 99 DETECTORS AND 99 ADDRESSABLE MODULE TOTAL DEVICES PER SLC LOOP WITHOUT REGARD TO DEVICE TYPE. THE FOLLOWING DEVICES SHALL BE SUPPORTED:

SK-Photo	Addressable Photoelectric Smoke detector
SK-Photo-T	Addressable Photoelectric Smoke detector with Thermal
SK-Ion	Addressable Ionization Sensor
SK-Heat	Addressable Heat Sensor
SK-Heat-ROR	Addressable Heat with Rate of Rise
SK-Heat-HT	Addressable Heat High temp 190°
SK-Acclimate	Addressable Multi Criteria Smoke detector with thermal
SK-Duct	Duct Detector
SK-Relay	Addressable Relay Module
SK-Relay-6	Addressable Multi Relay Module
SK-Monitor	Addressable Input Module (Class A or B)
SK-Minimon	Mini Input Module
SK-Monitor-2	Addressable Dual Input Module
SK-Mon-10	Addressable Multi Input Module (10)
SK-Control	Addressable Notification Module
SK-Control-6	Addressable Notification Multi Module (6)
SK-Zone	Two Wire Smoke Detector Module
SK-Zone-6	6 Multi Smoke Detector Module
SK-Iso	Isolation Module
SK-Beam	Addressable Beam Detector
SK-Beam-T	Addressable Beam Detector with Test feature
B224RB	Detector Relay Base
B200S	Detector Sounder Base
B224BI	Detector Isolator Base
RTS151KEY	Key Activated Remote Test Switch For Photoelectric Duct
Detector	
M02-04-01	Detector Test Magnet
M02-09-01	Telescoping Test Magnet
SK-Pull-SA	Addressable Single Action Pull Station
SK-Pull-DA	Addressable Dual Action Pull Station

The FACP shall support these other Silent Knight devices via addressable input, addressable notification, or addressable output modules.

PS-DALOB	Dual Action Manual Pull Outdoor Listed
PS-DAH	Dual Action Manual Pull Hex Key reset
PS-SATK	Single Action Manual Pull Station – Key Reset
PS-DATK	Dual action Manual Pull Station – Key Reset
PS-DASP	Dual action Manual Pull Station “Spanish”- Key reset
PS-SATK	Pull station, single action, key reset
PS-SATK-WP	Weather proof Pull station, single action, key reset
SB-I/O	Surface mount back box for outdoor use.
SB-10	Surface back box

4.3 FURNISH AND INSTALL, WHERE SHOWN ON THE DRAWINGS, THE FOLLOWING DEVICES:

4.3.1 Manual Fire Alarm Stations

Manual fire alarm stations shall be non-coded, break glass, single or double action type, with a key operated test-reset lock in order that they may be tested, and so designed that after actual emergency operation, they cannot be restored to normal except by use of a key. The reset key shall be so designed that it will reset manual station and open FACP without use of another key. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of fifty feet, front or side. Manual stations shall be constructed of LEXAN® with clearly visible operating instructions on the front of the stations in raised letters. Stations shall be suitable for surface mounting on matching back box or semi-flush mounting on a standard single-gang box and shall be installed within the limits defined by the Americans with Disabilities Act (ADA) dependent on manual station accessibility or per local requirements. Manual stations shall be Model SK-Pull-SA or SK-Pull-SA. If using conventional pull stations they must be installed in conjunction with an addressable input module (SK-Monitor) or mini input module (SK-Minimon). Manual stations shall be Silent Knight Model PS-DATK, PS-SATK, PS-DA or PS-SA and Underwriters Laboratories listed when used with addressable modules.

4.3.2 Remote Power Supplies

The remote power supplies for notification appliances shall be the Silent Knight Model 5895XL. The 5895XL intelligent power supplies shall hang on the main SBUS and be programmed through the 6820EVS control.

The 5895XL will support 6amps of 24 volt DC power, with 6 Flexput circuits, rated at 3amps each. Two additional 5815XL SLC loop expanders shall be capable of being installed in the cabinet, to allow an additional 396 points. The power supply will also regenerate the SBUS for an additional 6000 feet.

4.3.3 Notification Devices

The visual and audio/visual signaling devices shall be compatible with the 6820EVS or 5895XL as stated in the installation manuals and be listed with Underwriters Laboratories Inc. per UL 1971 and/or 1638. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults on the circuit wiring and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition. The notification appliance (combination audio/visual units only) shall produce a peak sound output of 90 dba or greater as measured in an anechoic chamber. The appliance shall be capable of meeting the candela requirements of the blueprints presented by the Engineer and ADA. The

appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount a single gang or double gang box or double workbox with the use of an adapter plate. The unit shall have an input voltage range of 16-33 volts.

4.3.4 Smoke Detectors

Smoke detectors shall be Silent Knight Model SK-Photo ceiling mounted, addressable photoelectric smoke detectors, SK-Ion ceiling mounted, addressable ionization smoke detector, or SK-Acclimate multi-criteria photoelectric smoke detector. The combination detector head and twist lock base shall be U.L. listed compatible with the Silent Knight 6820EVS fire alarm control panel. The base shall permit direct interchange with Silent Knight's SK-Ion ionization smoke detector, SK-Acclimate multi-criteria smoke detector or the SK-Heat detector. The base shall be the appropriate twist lock base B210LP. The smoke detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. The detector may be reset by actuating the control panel's reset switch. The sensitivity of the detector shall be capable of being selected and measured by the control panel without the need for external test equipment. The vandal security-locking feature shall be used in those areas as indicated on the drawing. The locking feature shall be field selectable when required. It shall be possible to perform a sensitivity test of the detector without the need of generating smoke. The test method shall simulate the effects of products of combustion in the chamber to ensure testing of the detector circuits. Detectors shall have completely closed back to restrict entry of dust and air turbulence and have a 30 mesh insect screen. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

4.3.5 Heat Detectors

Furnish and install analog/addressable heat detectors, Silent Knight model SK-Heat. The combination heat detector and twist lock base shall be U.L. listed compatible with the Silent Knight 6820EVS fire alarm control panel. The base shall permit direct interchange with the Silent Knight SK-Ion smoke detector, SK-Acclimate smoke detector and the SK-Photo photoelectric smoke detector. The base shall be appropriate twist lock base B210LP. The heat detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. The detector may be reset by actuating the control panel's reset switch. The vandal security-locking feature shall be used in those areas as indicated on the drawings. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

4.4 Duct Detectors

Duct Detector shall be Silent Knight Model SK-Duct Housing that includes the Model SK-Photo smoke detector head.

PART 5: WIRING

5.1 INSTALLER'S RESPONSIBILITIES

The installer shall coordinate the installation of the fire alarm equipment.

All conductors and wiring shall be installed according to the manufacturer's recommendations.

It shall be the installer's responsibility to coordinate with the supplier regarding the correct wiring procedures before installing any conduits or conductors.

5.2 INSTALLATION OF SYSTEM COMPONENTS

System components shall be installed in accordance with the latest revisions of the appropriate NFPA pamphlets, the requirements contained herein, National Electrical Code, local and state regulations, the requirements of the fire department and other applicable Authorities Having Jurisdiction (AHJ).

All wire used on the fire alarm system shall be U.L. listed as fire alarm protection signaling circuit cable per National Electrical Code, Articles 760.

PART 6: WARRANTY AND FINAL TEST

6.1 GENERAL

The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for one year (365 days) from the date of final acceptance.

6.2 FINAL TEST

Before the installation shall be considered completed and acceptable by the awarding authority, a test of the system shall be performed as follows:

The contractor's job foreman, a representative of the owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.

At least one half of all tests shall be performed on battery standby power.

Where application of heat would destroy any detector, it may be manually activated.

The communication loops and the indicating appliance circuits shall be opened in at least two (2) locations per circuit to check for the presence of correct supervision circuitry.

When the testing has been completed to the satisfaction of both the contractor's job foreman and owner, a notarized letter cosigned by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.

The contractor shall leave the fire alarm system in proper working order and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority.

Prior to final test the fire department must be notified in accordance with local requirements.

The Speech Transmission Index (STI) shall be used to test the voice-evac system using the test signal referred to as STIPA — STI Public Address. Test signals can differ between instrument manufacturers. Therefore, only the test signal recommended by the test instrument manufacturer shall be used with their instrument.

The voice intelligibility shall be considered acceptable if at least 90 percent of the measurement locations within each acoustically distinguishable space (ADS) have a measured STI of not less than 0.45 (0.65 CIS) and an average STI of not less than 0.50 (0.70 CIS). The measurement shall be taken from an elevation of 5 feet. For reference the STI scale can be converted to CIS via the following calculation: $CIS = 1 + \log (STI)$.

6.3 AS-BUILT DRAWINGS, TESTING, AND MAINTENANCE INSTRUCTIONS

6.3.1 As-Built Drawings

A complete set of reproducible “as-built” drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system.

6.3.2 Operating and Instruction Manuals

Operating and instruction manuals shall be submitted prior to testing of the system. Three (3) complete sets of operating and instruction manuals shall be delivered to the owner upon completion. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with U.L. Standard 864.

END OF SECTION

SECTION 31 05 13

SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Subsoil materials.
 - 2. Topsoil materials.

- B. Related Sections:
 - 1. Section 31 05 16 - Aggregates for Earthwork.
 - 2. Section 31 23 16 - Excavation.
 - 3. Section 31 23 17 - Trenching.
 - 4. Geotechnical Investigation by Leighton, Project No. 12159.004, dated October 2, 2021; bore hole locations, findings of subsurface materials, over excavation, ground reinforcement and recompaction.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 2. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in air-tight containers, 10 lb sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported materials source.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with local City and County Standards.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Materials (existing and import) are subject to the approval of the Soils Engineer for use in the project. All earthwork shall conform with the requirements of the Geotechnical Evaluation.

2.2 SUBSOIL MATERIALS

- A. Stockpiled Subsoil: Excavated on-site material with an organic content of less than 3 percent by volume, graded free of lumps and rocks larger than 3 inches, with not more 40 percent larger than 1 1/2 inches.
- B. Imported Subsoil: Low or very low-expansion (Expansion Index of 20 or less per C.B.C., Section 1803A.5.3) granular soils with a plasticity index of 12 or less, free of debris with lumps and rocks no larger than 3 inches. Materials shall contain sufficient fines (binder) to result in a stable subgrade. Imported material shall comply with DTSC requirements.
- C. Ball Field Subsoil: Free of rocks larger than 1 inch in the top 12 inches of subgrade.

2.3 TOPSOIL MATERIALS

- A. Stockpiled Topsoil: Excavated material, graded free of roots, rocks larger than one inch, subsoil, debris and large weeds.
- B. Imported Topsoil: Friable loam, free of subsoil, roots, grass, excessive amounts of weeds, stones and foreign matter; acidity range (ph) of 5.5 to 7.5; containing an amount of organic matter normal to the region.

2.4 ACCESSORIES

- A. The soil under the proposed buildings should be reinforced with Triax TX130S geogrid as detailed within the Structural Drawings and Geotechnical Report.

2.5 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Testing and inspection services.
- B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D1557.
- C. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D1557.
- D. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.
- B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.
- C. Remove excess excavated subsoil and topsoil not intended for reuse, from site.
- D. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site.

3.2 STOCKPILING

- A. Stockpile materials on site.

- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Stockpile topsoil 8 feet high maximum.
- E. Prevent intermixing of soil types or contamination.
- F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.3 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.
- B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 05 16

AGGREGATES FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Coarse aggregate materials.
 - 2. Fine aggregate materials.
- B. Related Sections:
 - 1. Section 31 05 13 - Soils for Earthwork: Fill and grading materials.
 - 2. Section 31 23 16 - Excavation.
 - 3. Section 31 23 17 - Trenching.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 2. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - 4. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in air-tight containers, 10 lb sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported materials suppliers.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Refer to Geotechnical Report for information and recommendations concerning soils at the site.
- B. Perform Work in accordance with local City and County Standards.

PART 2 PRODUCTS

2.1 COARSE AGGREGATE MATERIALS

- A. Coarse Aggregate (Gravel): Crushed Gravel; Angular crushed, washed stone; free of shale, clay, friable material and debris; graded in accordance with ASTM C136.
- B. Aggregate (Pea Gravel): Natural stone; washed, free of clay, shale, organic matter; graded in accordance with ASTM C136; to the following limits:

1. Minimum Size: 1/4 inch.
2. Maximum Size: 5/8 inch.

2.2 FINE AGGREGATE MATERIALS

- A. Fine Aggregate (Sand): Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with ASTM C136; all passing the No. 4 sieve and not more than 5% passing the No. 200 sieve.

2.3 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Testing and inspection services.
- B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with ASTM C136.
- C. Fine Aggregate Material - Testing and Analysis: Perform in accordance with ASTM C136.
- D. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 STOCKPILING

- A. Stockpile materials on site.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.2 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.
- B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing surface debris.
 - 2. Clear site of plant life and grass.
 - 3. Removing designated trees, shrubs, and other plant life.
 - 4. Removing abandoned utilities.
- B. Related Sections:
 - 1. Section 31 22 13 - Rough Grading.

1.2 QUALITY ASSURANCE

- A. Perform Work in accordance with County of San Bernardino standard.
- B. Conform to local code for environmental requirements, lawful disposal of debris, and dust control.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.

3.2 PREPARATION

- A. Call Local Utility Line Information service not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect utilities indicated to remain, from damage. Coordinate with appropriate utility companies.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping.
- C. Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 CLEARING

- A. Clear areas required for access to site and execution of Work.
- B. Remove trees and shrubs indicated. Remove stumps, main root ball, root system trees and shrubs and surface rock.
- C. Clear undergrowth and deadwood, without disturbing subsoil.

3.5 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- C. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- D. Do not burn or bury materials on site. Leave site in clean condition.

END OF SECTION

SECTION 31 22 13

ROUGH GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Remove topsoil and stockpile for later reuse. Remove excess from site.
- B. Excavate subsoil and stockpile for later reuse. Remove excess from site.
- C. Grade and rough contour site.

1.2 REFERENCES

- A. 2022 California Building Code, Chapter 33.
- B. San Bernardino County Code.
- C. City of Yermo Dust Control Ordinance.

1.3 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01 70 00.
- B. Accurately record location of utilities remaining, rerouted utilities, new utilities by horizontal dimensions, elevations or inverts, and slope gradients.

1.4 PROTECTION

- A. Protect trees, shrubs, lawns, and other features remaining as portion of final landscaping.
- B. Protect bench marks.
- C. Protect above or below grade utilities which are to remain.
- D. Repair damage.

1.5 QUALITY ASSURANCE

- A. Refer to Document 00220 for information concerning soils at the site.
- B. Comply with 2022 California Building Code, Chapter 33.
- C. Comply with San Bernardino County Code.
- D. Comply with City of Yermo Dust Control Ordinance.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Topsoil: Excavated material, graded free of roots, rocks larger than one inch, subsoil, debris, and large weeds.
- B. Subsoil: Excavated material, graded free of lumps larger than 6 inches, rocks larger than 3 inches and debris.

PART 3 EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Identify known below grade utilities. Stake and flag locations.
- C. Identify and flag above grade utilities.
- D. Maintain and protect existing utilities remaining which pass through work area.
- E. Notify utility company and pay all costs to remove and relocate utilities.
- F. Upon discovery of unknown utilities or conditions, discontinue affected work; notify Architect.

3.2 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, re-landscaped, or regraded and stockpile in area designated on site. Remove excess topsoil not being reused from site.
- B. Do not excavate wet topsoil.
- C. Stockpile topsoil to depth not exceeding 8 feet. Cover to protect from erosion.

3.3 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be re-landscaped or regraded and stockpile in area designated on site. Remove excess subsoil not being reused from site.
- B. Do not excavate wet subsoil
- C. Stockpile subsoil to depth not exceeding 8 feet.
- D. When excavation through roots is necessary, perform work by hand and cut roots with sharp axe.

3.4 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 0.1 foot.

END OF SECTION

SECTION 31 23 16

EXCAVATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavation for building foundations.
- B. Excavation for slabs-on-grade, paving, and landscaping.
- C. Excavation for site structures.

1.2 REFERENCES

- A. California Building Code: Chapter 33, 8 Chapter 18 A.

1.3 QUALITY ASSURANCE

- A. Comply with Chapter 29 of the California Building Code.
- B. Refer to Document 00220 – Geotechnical Data for information concerning soils at the site.

1.4 FIELD MEASUREMENTS

- A. Verify that survey benchmark and intended elevations for the Work are as indicated.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.2 EXCAVATION

- A. Underpin adjacent structures which may be damaged by excavation work, including utilities and pipe chases.
- B. Excavate subsoil required to accommodate building foundations, slabs-on-grade, paving and site structures, and construction operations.
- C. Machine slope banks to angle of repose or less, until shored.
- D. Excavation cut not to interfere with normal 45 degree bearing splay of foundation.
- E. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- F. Hand trim excavation. Remove loose matter.

- G. Remove lumped subsoil, boulders, and rock up to 1/3 cu. yd. measured by volume.
- H. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- I. Correct unauthorized excavation at no extra cost to Owner.
- J. Stockpile excavated material in area designated on site and remove excess material not being reused, from site.

3.3 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01 41 00.
- B. Provide for visual inspection of bearing surfaces.

3.4 PROTECTION

- A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation, from freezing.

END OF SECTION

SECTION 31 23 17

TRENCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavate trenches for utilities from outside building to municipal utilities.
- B. Compacted bedding under fill over utilities.
- C. Backfilling and compaction.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 2. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
 - 3. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 inch Drop.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Samples: Submit 10 lb. sample of each type of fill to testing laboratory in air-tight containers.

1.4 FIELD MEASUREMENTS

- A. Verify that survey benchmark and intended elevations for the work are as indicated.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Types specified in Section 31 05 13.

2.2 BED MATERIALS

- A. Sand: As specified for Type in Section 31 05 16.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify fill materials to be reused are acceptable.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.

- B. Cut out soft areas of subgrade not capable of insitu compaction. Backfill with subsoil and compact to density equal to or greater than requirements for subsequent backfill material.

3.3 EXCAVATION

- A. Excavate subsoil required for storm sewer, sanitary sewer, water, and gas piping to municipal utilities.
- B. Cut trenches sufficiently wide to enable installation of utilities and allow inspection.
- C. Excavation shall not interfere with normal 45 degree bearing splay of foundations.
- D. Hand trim excavation. Remove loose matter.
- E. Remove lumped subsoil, boulders, and rock.
- F. Correct unauthorized excavation at no cost to Owner.
- G. Correct areas over-excavated by error in accordance with Section 31 23 16.
- H. Stockpile excavated material in area designated on site and remove excess material not being used, from site.

3.4 BEDDING

- A. Support pipe and conduit during placement and compaction of bedding fill.

3.5 BACKFILLING

- A. Backfill trenches to contours and elevations.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Sand Fill: Place and compact materials in continuous layers not exceeding 6 inches compacted depth.
- D. Maintain optimum moisture content of backfill materials to attain required compaction density.
- E. Remove surplus backfill materials from site.

3.6 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus one inch from required elevations.

3.7 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 41 00.
- B. Tests and analysis of fill material will be performed in accordance with ANSI/ASTM D1557 and with Section 01 41 00.
- C. Compaction testing will be performed in accordance with ANSI/ASTM D1557 and with Section 01 41 00.

- D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

3.8 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01 70 00.
- B. Re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 31 23 23

FILL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Buildings perimeter and site structure backfilling to subgrade elevations.
- B. Site filling and backfilling.
- C. Fill under slabs-on-grade and paving.
- D. Consolidation and compaction.
- E. Fill for over-excavation.

1.2 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 inch Drop.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Samples: Submit 10 lb. sample of each type of fill to testing laboratory in air-tight containers.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Stockpiled Subsoil: Excavated material, graded free of lumps and rocks larger than 3 inches.
- B. Imported Subsoil: Non-expansive predominantly granular soils, such as a silty sand, free of lumps and rocks larger than 6 inches, an debris. Expansion index less than 35, and no more than 50% of the material shall pass a No. 200 sieve. Material shall contain sufficient fines (binder) to result in a stable subgrade. Imported material shall comply with DTSC requirements.
- C. Sand: Natural River or Bank Sand: Free of silt, clay, loam, friable or soluble materials or organic matter all passing the No. 4 sieve and only 5% passing the No. 200 sieve.
- D. Pea Gravel: Natural Stone; washed, free of clay, slate, organic matter, graded in accordance with ANSI/ASTM C136, 1/4 inch to 5/8 inch.
- E. Concrete: Structural concrete conforming to Section 03 30 00 with a compressive strength of 2,500 psi for fill to correct over-excavation.

- F. Materials (existing and import) are subject to the approval of the Soils Engineer for use in the project.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify fill materials to be reused are acceptable.
- B. Verify areas to be backfilled are free of debris or water.

3.2 PREPARATION

- A. Generally, compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of insitu compaction. Backfill with subsoil fill and compact to density equal to or greater than requirements for subsequent backfill material.
- C. Prior to placement of aggregate base course material at paved areas, compact subsoil to 95 percent of its maximum dry density in accordance with ANSI/ASTM D1557.

3.3 BACKFILLING

- A. Backfill areas to contours and elevations.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Soil Fill: Place and compact material in continuous layers not exceeding 6 inches compacted depth.
- D. Employ a placement method that does not disturb or damage foundation perimeter drainage, foundation waterproofing and protective cover and utilities in trenches.
- E. Maintain optimum moisture content of backfill materials to attain required compaction density.
- F. Backfill against supported foundation walls.
- G. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- H. Slope grade away from building minimum 2 inches in 10 ft., unless noted otherwise.
- I. Make changes gradual. Blend slope into level areas.
- J. Remove surplus backfill materials from site.

3.4 TOLERANCES

- A. Top Surface of Backfilling: Plus or minus one inch from required elevations.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 41 00.

- B. Tests and analysis of fill material will be performed in accordance ANSI/ASTM D1557 and with Section 01 41 00.
- C. Compaction testing will be performed in accordance with ANSI/ASTM D1557 and with Section 01 41 00.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

3.6 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01 50 00.
- B. Recompact fills subjected to vehicular traffic.

END OF SECTION

SECTION 32 05 13

RUBBERIZED PLAYGROUND SAFETY SURFACE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rubberized Playground safety surface.

1.2 RELATED WORK

- A. 11 68 14 Play Structure
- B. 32 12 16 Asphaltic Paving
- C. 32 13 13 Concrete Paving

1.3 REFERENCES

- A. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
- B. ASTM D624 Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
- C. ASTM D2047 Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
- D. ASTM D2859 Standard Test Method for Flammability of Finished Textile Floor Covering Materials.
- E. ASTM E303 Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.
- F. ASTM F1292 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.
- G. ASTM F1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.
- H. 2022 California Building Code
 - 1. 11B-1008.2.6 Ground Surfaces: Ground surfaces on accessible routes, clear floor or ground spaces, and turning spaces shall comply with Section 11B-1008.2.6.
 - 2. 11B-1008.2.6.1 Accessibility: Ground surfaces shall comply with ASTM F1951. Ground surfaces shall be inspected and maintained regularly and frequently to ensure continued compliance with ASTM F1951.
 - 3. 11B-1008.2.6.2 Use Zones: Ground surfaces located within use zones shall comply with ASTM F1292 (1999 edition or 2004 edition).

1.4 PERFORMANCE REQUIREMENTS

- A. Materials of this section shall provide a 2 layer rubber-urethane playground surfacing system for all weather conditions, firm playground surface that supports wheelchairs, crutches and walkers and virtually eliminates the risk of serious injury at drop heights from 7'-0" maximum.

1.5 QUALITY ASSURANCE

- A. Qualifications: Utilize an installer approved and trained by the manufacturer of the playground surfacing system or a direct employee of the manufacturer's installation division, having experience with other projects of the scope and scale of the work described in this section with a minimum of five (5) years' experience.
- B. Certifications: Certification by manufacturer that installer is an approved applicator of the playground surfacing system.
- C. International Play Equipment Manufacturers Association (IPEMA) certified.

1.6 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Section 01 33 00.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at a minimum temperature of 40 degrees F (4 degrees C) and a maximum temperature of 90 degrees F (32 degrees C).

1.7 PROJECT/SITE CONDITIONS

- A. A. Environmental Requirements: Install surfacing system when minimum ambient temperature is 40 degrees F (1 degree C) and maximum ambient temperature is 95 degrees F (32 degrees C). Exception to the temperature requirements can be made by the manufacturer of the surfacing system. Do not install in steady or heavy rain.

1.8 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate specific installation details of specified products.
- C. Product Data: Provide manufacturer's printed literature for specified products.
- D. Manufacturer's Installation Instructions: Indicate specific installation sequence, special instructions.
- E. Maintenance Guide: Provide manufacturer's printed maintenance guide for surface material indicating how to maintain compliance with ASTM 1591.99.
- F. Provide samples under provisions of Section 01 33 00.
- G. ASTM F1292 Impact Attenuation Test Certification for the poured-in-place system to be installed in compliance with the Critical Fall Height as determined by the Playground Equipment to be installed in conjunction with the poured-in-place surfacing system.

- H. Quality Assurance/Control Submittals: Submit the following:
 - 1. Certificate of qualifications of the playground surfacing installer.
- I. Closeout Submittals: Submit the following:
 - 1. Warranty documents specified herein.

1.9 WARRANTY

- A. Submit a Statement of Warranty for a minimum five year period with detailed Warranty Claim requirements of the owner and specific procedures to be followed by the manufacturer in terms of response and repair of warranty claims.

PART 2 PRODUCTS

2.1 PLAYGROUND SAFETY SURFACE

- A. SpectraPour playground surfacing as manufactured by SpectraTurf, (800) 875-5788.
- B. MaxPour Safety Surfacing (951) 250-6039 or (951) 371-6504
- C. Substitutions: Under provisions of Section 01 33 00.

2.2 MATERIALS

- A. The SpectraPour surface shall be manufactured from EPDM and SBR rubber compounds mixed with a 100% MDI based Polyurethane Resin. Polyurethane contained any TDI shall not be allowed due to environmental regulations.
- B. Cushion Course shall be a mixture of shredded and a 1-4mm SBR rubber particles of heterogeneous distribution bonded by a polyurethane binder applied to 100% of the rubber and installed to a designated thickness as required by the Consumer Product Safety's Commission's Guidelines and ASTM F 1292 Test Criteria.
- C. Binder
 - 1. Aliphatic polyurethane binder.
 - C. Wearing Surface shall be a mixture of black EPDM or colored EPDM 1-4 MM granules bonded by a polyurethane binder applied to 100% of the granules and applied to a minimum thickness of 3/8" over the cushion layer. Color choice and blend ratios to be of color selected by the architect from a full range of colors.
- D. Finish Texture: Pebble grain.

2.3 MIXES

- A. Required mix proportions by weight:
 - 1. Basemat: 16+% urethane (as ratio: 14% urethane divided by 86% rubber). 14% urethane, 86% rubber (based on entire rubber & urethane mix).
 - 2. Top Surface: 22% urethane (ratio: 18% urethane divided by 82% rubber). 18% urethane, 82% rubber (based on entire rubber & urethane mix).

PART 3 EXCAVATION

3.1 EXAMINATION

- A. Verify that the substrate and adjacent materials are dry and ready to receive play-ground safety surface.
- B. Substrate preparation must be in accordance with surfacing manufacturer's specification. New asphalt must be fully cured – up to 30 days. New concrete must be fully cured – up to 7 days.
- C. Proper drainage is critical to the longevity of the SpectraPour CA Poured-in-Place surfacing system. Inadequate drainage will cause premature breakdown of the poured system in affected areas; and void the warranty.
- D. Coordinate with the playground equipment installer for footing depths and locations.

3.2 PREPARATION

- A. Surface Preparation: Using a brush or short nap roller, apply primer to the substrate perimeter and any adjacent vertical barriers such as playground equipment support legs, curbs or slabs that will contact the surfacing system at the rate of 300 ft²/gal.

3.3 INSTALLATION

- A. Install play-ground safety surface in strict accordance with manufacturer's printed installation instructions. Manufacturer states not proceed with playground surfacing installation until all applicable site work, including substrate preparation, fencing, playground equipment installation and other relevant work, has been completed.
- B. Verify that equipment installation meets safety standards to ensure there is a maximum of 7'-0" fall height. Thickness of material varies based on play equipment fall height.
- C. Turn down all unsupported edges to eliminate undermining.
- D. Horizontal coverage and paths shall be determined by the contractor and meet all applicable codes and regulations and all manufacturers requirements.

3.4 PROTECTION

- A. Protect the installed playground surface from damage resulting from subsequent construction activity on the site.

3.5 MAINTENANCE

- A. Contractor shall provide School District with manufacturer's written instructions for surface material regular maintenance program indicating how to maintain compliance with ASTM 1591.99.

3.6 CLOSE OUT

- A. Upon completion of work in this Section, Contractor shall remove all equipment, excess material and waste products from site.

END OF SECTION

SECTION 32 12 16
ASPHALT PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Herbicide
- B. Prepared base.
- C. Asphaltic concrete paving.
- D. Surface sealer.

1.2 RELATED SECTIONS

- A. Section 31 23 23 - Fill
- B. Section 32 13 13 - Concrete Paving
- C. Section 32 17 13 - Parking Bumpers
- D. Section 32 17 23 - Pavement Markings
- E. Section 33 41 00 - Storm Utility Drainage Piping

1.3 REFERENCES

- A. The "Standard Specifications for Public Works Construction" (SSPWC) or "Greenbook Standards" and the "Standard Plans for Public Works Construction", 2015 Edition.
- B. Asphalt Surfacing Materials: Furnish asphalt surfacing meeting the following requirement, furnished from a commercial asphalt central mixing plant.
- C. Asphalt Binder: AASHTO M 320, PG 70-10
- D. Asphalt Cement: ASTM 0338110 3381 M for viscosity-graded material, ASTM 0 946/0 946M for penetration-graded material.
- E. Emulsified Asphalt Prime Coat: ASTM 0 977 or AASHTO M 140 emulsified asphalt, or ASTM 02397 or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- F. Tack Coat: ASTM 0977 or] AASHTO M 140 emulsified asphalt, or ASTM 02397 or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application
- G. Seal Coat: California Greenbook 203-9 Specification
- H. Undersealing Asphalt: ASTM 03141/0 3141M; pumping consistency.

- I. Redwood Inspection Service - Standard Specifications for Grades of California Redwood Lumber.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with Standard Specifications for Public Works Construction.
- B. Mixing Plant: Conform to State of California standards.
- C. Obtain materials from same source throughout.
- D. The Owners's inspector shall test the temperature of each batch of asphaltic concrete prior to placement. At the time of delivery to the work site, the temperature of mixture shall not be lower than 260 degrees F or higher than 320 degrees F, the lower limit to be approached in warm weather and the higher in cold weather. If asphaltic concrete temperature is not with these tolerances the affected batch shall be rejected.
- E. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
- F. Seal Coat Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located. Comply with the following as a minimum requirement: Standard Specifications Section 203-9, "SEALCOAT - ASPHALT BASED"
- G. Agitate bulk materials during transport

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable San Bernardino County standards for paving work on public property.

1.6 TESTS

- A. Testing and analysis of asphaltic mix will be performed under provisions of Section 01 41 00.
- B. Submit proposed mix design of each class of mix for review prior to commencement of work.
- C. Submit sample of base a minimum of three weeks prior to placing for testing.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not place asphalt when base surface temperature is less than 40 degrees F.

PART 2 PRODUCTS

2.1 AGGREGATES

- A. Base Course Material: Crushed base material shall consist of materials that meet the provisions of the SSPWC.Sub-Base Aggregate Maximum Size: 1-1/2 inches.
 - 1. Crushed Aggregate Base (CAB) per Section 200-2.2, 3/4 " maximum of the SSPWC (Green Book).
 - 2. Crushed Miscellaneous Base (CMB) per Section 200-2.4, fine Sieve, of the SSPWC (Green Book).
 - 3. Crushed Miscellaneous Base (CMB) shall not contain Poly Chlorinated biphenyls (PCB) above laboratory detection limits when testing in accordance with EPA Method 8082.

- 4. Crushed aggregate base (CAB) shall consist of native rock without naturally occurring asbestos or recycled materials.
- B. Coarse Aggregate: ASTM 069210 692M, sound; angular crushed stone, crushed gravel.
- C. Fine Aggregate: ASTM 0 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, or combinations thereof.

2.2 HERBICIDE

- A. Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

2.3 HEADERS AND STAKES

- A. Headers: Construction heart grade, per paragraph 114 of Standard Specifications for Grades of California Redwood Lumber.
- B. Stakes: Redwood of grade specified for headers.
- C. Nails: Common, galvanized, 12d minimum.

2.4 ASPHALTS

- A. Comply with provisions of Standard Publications for Public Works Construction:
 - 1. Paving Asphalt: PG 70-10
 - 2. Prime Coat: Liquid Asphalt, SC250 at areas w/ aggregate base only.
 - 3. Tack Coat: Emulsified asphalt, SS-1h.

2.5 ASPHALTIC PAVING MIX

- A. Provide hot plant mixed asphaltic concrete paving materials in accordance with section 203-6 of Standard Specifications for Public Works Construction.
 - 1. Base Course Mix: Type II, B, PG 70-10
 - 2. Parking and Drive Area Mix: Type II, C1, PG 70-10
 - 3. Hardscape Play Area Mix: Type II, D, PG 70-10

2.6 SEAL COAT

- A. Seal Coat: The materials for sealcoat shall conform to California Greenbook 203-9 Specification - "Sealcoat-Asphalt Based" of the Standard Specifications.

Seal Coat: Provide one of the following surface seals:

- 1. Diversified Asphalt Product: Over Kote
- 2. Western Colloid Products: Armor Top
- 3. Asphalt Coating Engineering: ACE Seal
- 4. SealMaster Pavement Products: MasterSeal

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify compacted subgrade is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

- A. Apply weed killer to entire area to be paved. Follow manufacturer's application directions and provide sterilization certification from installer.

3.3 PLACEMENT OF BASE COURSE

- A. Base:
 - 1. Spread the granular base material to a thickness providing the compacted thickness shown on the Drawings.
 - 2. Compact base to 90% relative compaction in all areas and 95% in bus and fire lane areas.
- B. Thickness Tolerance: Minus 0.0 inch to plus 0.5 inch.
- C. Smoothness Tolerance: 3/8" in ten feet.
- D. Deviations: Correct by removing materials, replacing with new materials, and reworking or recompacting as required.
- E. Moisture content: Only the amount needed to achieve the specified compaction.

3.4 PLACEMENT OF ASPHALTIC CONCRETE PAVING

- A. Install headers and stakes to achieve arrangement of paving shown on the Drawings.
- B. Remove all loose materials from compacted base.
- C. Apply prime coat, and tack coat where required, and allow to dry.
- D. Adjust frames and covers, if so required, to meet final grades.
- E. Spreading Asphaltic Concrete Materials:
 - 1. Spread material in a manner which requires the least handling.
 - 2. Where thickness of finished paving will be 3 inches or less, spread in one layer unless otherwise indicated.
- F. Rolling:
 - 1. After material has been spread to proper depth, roll until the surface is hard, smooth, unyielding, and true to the thickness and elevations shown.
 - 2. Roll in at least two directions until no roller marks are visible.
 - 3. Finished paving smoothness tolerance:
 - a. Free from birdbaths.
 - b. No deviations greater than 1/8 inch in six feet.

3.5 SEAL COAT

- A. Apply sealcoat using a truck mounted tank, wheeled container, or can. Spread in continuous parallel lines by means of rubber faced squeegees, brooms or spray technique. On excessively rough areas consult your manufacturer's representative. Apply seal coat to all asphalt concrete in accordance with manufacturer's instructions in two separate coats. Do not apply seal coat until 30 days after placing of asphaltic concrete paving.

3.6 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 41 00.
- B. Contractor to flood test paved areas after completion and prior to application of seal coat. Repair areas not conforming to specified tolerances as required prior to seal coat application.

3.7 PROTECTION

- A. Immediately after placement, protect pavement under provisions of Section 01 50 00 from mechanical injury for 2 days.

END OF SECTION

SECTION 32 13 13
CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete sidewalks, curbs, gutters, utility slabs, parking areas, driveways, driveway aprons and approaches.

1.2 RELATED SECTIONS

- A. Section 31 23 23 - Fill
- B. Section 32 12 16 - Asphaltic Paving
- C. Section 32 17 13 - Parking Bumpers
- D. Section 32 17 23 - Pavement Markings
- E. Section 33 41 00 - Storm Utility Drainage Piping

1.3 REFERENCES

- A. American Concrete Institute
 - 1. ACI 301 - Specifications for Structural Concrete.
- B. ASTM International:
 - 1. ASTM A185/A185M - Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement.
 - 2. ASTM A615/A615M - Deformed and Plain Billet-steel Bars for Concrete Reinforcement.
 - 3. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 4. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
 - 5. ASTM C150 - Standard Specification for Portland Cement.
 - 6. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
 - 7. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
 - 8. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
- B. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").
- C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- D. Obtain materials from same source throughout.
- E. Refer to Document 00220 – Geotechnical Data for information concerning soils at the site.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for paving work on public property.
- B. Portland cement concrete paving shall be stable, firm, and slip resistant and shall comply with CBC Sections 11B-302 and 11B-403.

1.6 TESTS

- A. Testing and analysis will be performed under provisions of Section 01 41 00.
- B. Submit proposed mix design to testing laboratory for review prior to commencement of work.
- C. Owner's Inspector or Testing firm will take cylinders and perform slump tests in accordance with ACI 301.

1.7 SUBMITTALS

- A. Submit product data for under provisions of Section 01 33 00.
- B. Submit manufacturer's instructions under provisions of Section 01 33 00.
- C. Concrete mix design, admixtures & curing compounds
- D. Include data on joint filler and curing compounds.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150 Normal-Type I Portland type, gray color.
- B. Fine and Coarse Aggregates: ASTM C33.
- C. Water: Clean and not detrimental to concrete.

2.2 FORM MATERIALS

- A. Conform to ACI 301.
- B. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces
- C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, Grade 60; deformed billet steel bars, uncoated finish.
- B. Welded Steel Wire Fabric: Plain type, ANSI/ASTM A185; in coiled rolls; uncoated finish.
- C. Tie Wire: Annealed steel, minimum 16 gage size.
- D. Dowels: ASTM A615, Grade 60, plain steel, uncoated finish.

2.4 ACCESSORIES

- A. Curing Compound: ASTM C309, Type 1-D.
- B. Preformed Joint: ASTM D1751, 3/8 inch thick, manufactured by W.R. Meadows, Inc., (847) 214-2100, or equal.
 - 1. Follow manufacturer's instructions for SNAP-CAP and bond-breaker requirements.
- C. Joint Filler: Sikaflex-1C SL, or equal. Single component, self-leveling, premium-grade polyurethane sealant with an accelerated curing capacity. Meets Federal Specification TT-S-00230C, Type 1, Class A. Meets ASTM C-920, Type S, Grade P, Class 25, use T, NT, M, O, G, I.
 - 1. Apply finishing sand over the fresh sealant while it is still sticky at the surface. Color to match adjacent concrete surfaces.

2.5 ADMIXTURES

- A. Air Entrainment: ASTM C260.
- B. Water Reducer: ASTM C 494/C 494M, Type A.
- C. Hydration Controlling Admixture: MasterSet Delvo

2.6 CONCRETE MIX

- A. Mix concrete in accordance with ASTM C94.
- B. Provide concrete of the following characteristics:
 - 1. Driveways, Aprons and Approaches: Compressive strength of 3,000 psi at 28 days.
 - 2. Sidewalks, Curbs, Gutters and Utility Slabs: Compressive Strength of 3,000 psi at 28 days.
 - 3. Concrete for paving/flatwork does not require special inspection provided that CBC Section 1705A.3.3.1 requirements are followed.
- C. Add air entraining agent to concrete mix for concrete work exposed to exterior.
- D. Aggregates
 - 1. Fine Aggregates: Fine aggregate shall consist of natural sand, manufactured sand, or a combination of the two, and is composed of clean, hard, durable particles. Fine aggregate shall conform to the quality and gradation requirements of ASTM C 33/C 33M.
 - 2. Coarse Aggregates: Coarse aggregate shall conform to ASTM C 33/C 33M, Class 5S, size designation 57 or 67.
 - 3. Mix designs shall be a 1" minus type mix.

- E. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent. Limit percentage, by weight, of cementitious materials other than portland cement. ASTM 618, Class F

2.7 FINISHES

- A. All paving shall provide medium salted or medium broom finish on all surfaces sloped less than 6% and slip resistant with heavy broom finish on all surfaces sloped greater than 6%. Comply with CBC Section 11B-302.1.
- B. Surface slopes of accessible parking spaces and access aisles shall be the minimum possible and shall not exceed 2.08% (1:48) slope in any direction. Comply with CBC Section 11B-302 & 11B-502.4.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify compacted subgrade is ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concreting operations.
- B. Notify Architect a minimum of 24 hours prior to commencement of concreting operations.

3.3 FORMING

- A. Place and secure forms to correct location, dimension, and profile.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint fillers vertical in position, in straight lines. Secure to formwork during concrete placement.

3.4 REINFORCEMENT

- A. Place reinforcement at mid-height of slabs-on-grade. Interrupt reinforcement at joints.
- B. Place reinforcement to achieve slab and curb alignment as detailed.

3.5 FORMED JOINTS

- A. Place expansion joints at 20 foot intervals to correct elevation and profile. Align curb, gutter, and sidewalk joints.
- B. Place joint filler between paving components and building or other appurtenances.
- C. Provide scored joints at indicated intervals of sidewalk.

3.6 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301 for Hot and Cold Weather Placement.
- B. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- C. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- D. Place concrete to pattern indicated. Place tooled control joints at an optimum time after finishing.
- E. The concrete shall be mixed and placed as specified in this Section. The surfaces shall be finished in the manner specified in Article 3.8. Joint and edges shall be tooled.
- F. Exterior concrete slabs and paving shall be poured in panels approximately 400 sq. ft. in area.

3.7 EXPANSION AND CONTROL JOINTS

- A. Sidewalks and covered passage slabs shall be built with expansion joints where shown on drawings, or as follows: Expansion joints for sidewalks shall be spaced approximately every 20' in each direction, maximum. Expansion joints shall be provided at all covered passage intersections, passages with each other and with other concrete, at all corners of buildings and walks.
- B. Expansion joint material shall be of durable elastic compound so prepared that it will retain its required form during the placing of concrete. When compressed to half its thickness it shall return to 70% of its original thickness. Expansion joints shall extend entirely through the slab and be in one piece for the width of the slab.
- C. Control Joints: Provide tooled control joints 16 to 20 hours after pour, centered between expansion joints or as shown on plans.

3.8 FINISHING

- A. Driveway Paving: Light broom. Comply with San Bernardino County requirements for all off-site driveways.
- B. Sidewalk Paving: medium broom at surfaces that slope less than 6%, heavy broom at surfaces that slope greater than 6%; radius and trowel joint edges.
- C. Curbs and Gutters: Light broom.
- D. At joints, round off top edge of the slab with 1/4 inch edging tool.
- E. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.9 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 41 00.

3.10 PROTECTION

- A. Immediately after placement, protect concrete under provisions of Section 01 50 00 from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION

SECTION 32 17 13
PARKING BUMPERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Parking bumpers
- B. Adhesive.
- C. Steel bars for installation.

1.2 RELATED SECTIONS

- A. Section 32 12 16 - Asphalt Paving
- B. Section 32 13 13 - Concrete Paving
- C. Section 32 17 23 – Pavement Markings

1.3 REFERENCES

- A. State of California, Department of Transportation (Caltrans), Standard Specifications, latest edition

1.4 PERFORMANCE REQUIREMENTS

- A. Paint Adhesion: Adhere to surface forming smooth continuous film two minutes after application.
- B. Paint Drying: Tack free by touch so as not to require coning or other traffic control devices to prevent transfer by vehicle tires within five minutes after application.

1.5 SUBMITTALS

- A. Section 01 30 00 - Submittals: Requirements for submittals.
- B. Shop Drawings: Submit Shop Drawings of bumpers, including plan layout and installation details, for approval.
- C. Product Data: Submit manufacturers' product data of precast bumpers and epoxy adhesive for approval.

1.6 QUALITY ASSURANCE

- A. Precast parking bumpers shall be manufactured for the intended purpose by a company or firm specializing in the manufacture of precast concrete parking appurtenances.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five years experience.

- B. Applicator: Company specializing in performing work of this section with minimum three years documented experience approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 40 00 - Quality Control: Requirements for transporting, handling, storing, and protecting products.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

- A. American Precast Concrete, (626) 443-0970
- B. California Car Stops (951) 549-3785
- C. American Precast Concrete Inc (800) 691-7118
- D. Substitutions: Under provisions of Section 01 60 00.

2.2 MATERIAL

- A. Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete, 4000-psi minimum compressive strength, 5-1/2 inches high by 7 ½ inches wide by 48 inches long. Provide chamfered corners, transverse drainage slots on underside, and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.
- B. Steel reinforced anchor pins where required

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install wheel stops at all parking stalls as indicated on Drawings.
- B. Anchor permanently in place in accordance with manufacturer's directions with epoxy adhesive and .

END OF SECTION

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Traffic lines and markings and paint.
- B. Tactile detectable warning devices.

1.2 RELATED SECTIONS

- A. Section 32 12 16 - Asphalt Paving.
- B. Section 32 13 13 - Concrete Paving.
- C. Section 32 17 13 - Parking Bumpers

1.3 REFERENCES

- A. AASHTO M309 - White and Yellow Fast-Dry Traffic Paint.
- B. ASTM International:
 - 1. ASTM D34 - Chemical Analysis of White Pigments.
 - 2. ASTM D969 - Laboratory Determination of Degree of Bleeding of Traffic Paint.
 - 3. ASTM D1475 - Density of Liquid Coatings, Inks, and Related Products.
 - 4. ASTM D2371 - Pigment Content of Solvent-Reducible Paints.
- C. Federal Test Method Standard No. 41.
- D. FS TT-P 1952D Type I.
- E. FS TT-P 1952D Type II.

1.4 PERFORMANCE REQUIREMENTS

- A. Paint Adhesion: Adhere to surface forming smooth continuous film two minutes after application.
- B. Paint Drying: Tack free by touch so as not to require coning or other traffic control devices to prevent transfer by vehicle tires within five minutes after application.

1.5 PAVEMENT MARKINGS REQUIREMENTS

- A. Accessible parking spaces serving a particular building or facility shall be located, and dispersed if serving more than one accessible entrance, on the shortest accessible route to an entrance or to multiple accessible entrances. CBC Sections 11B-208.3.1
- B. Accessible parking spaces in a parking facility not serving a particular building or facility shall be located on the shortest accessible route to an accessible pedestrian entrance of the parking facility. CBC Sections 11B-208.3.1
- C. Minimum number of required accessible parking spaces shall be provided in accordance with CBC Table 11B-208.2 for each parking facility provided.

- D. For every six or fraction of six accessible parking spaces, at least one shall be an accessible van parking space. CBC Section 11 B-208.2.4
- E. Accessible parking spaces and access aisles shall comply with CBC Section 11B-502 and shall be dimensioned to the centerline of the marked lines as follows:
1. Parking spaces and access aisles shall be marked according to CBC Figures 11B-502.2, 11B-502.3, and 11B-502.3.3. Their surfaces shall comply with CBC Section 11B-302 and shall be at the same level with slopes not steeper than 1 :48 in any direction. CBC Section 11B-502.4
 2. Parking spaces shall be 9'x18' minimum and van parking spaces shall be 12'x18' minimum with an adjacent access aisle of 5'x18' minimum. Access aisles shall be placed on either side of the parking spaces except be located on the passenger side for van parking spaces. Van parking spaces shall be permitted to be 9'x18' minimum where the access aisle is 8'x18' minimum.
 3. Access aisles shall be marked by a blue painted borderline around their perimeter. The area within the blue borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface, preferably blue or white. Access aisle markings may extend beyond the minimum required length. CBC Section 11B-502.3.3
 4. Access aisles (parking spaces as well - similar application) shall not overlap the vehicular way. CBC Section 11B-502.3.4
 5. A vertical clearance of 8'-2" minimum shall be provided for accessible parking spaces, access aisles, and vehicular routes serving them. CBC Section 11B-502.5
- F. At least one passenger loading zone shall be provided in every continuous 100 linear feet of loading zone space, or fraction thereof, complying with CBC Sections 11B-209 and 11B-503 as follows:
1. Vehicle pull-up spaces shall be 8'x20' minimum . Access aisles shall be 5'x20' minimum and shall be adjacent and parallel to the vehicular pull-up spaces. They shall be at the same level with slopes not steeper than 1:48 in any direction. CBC Section 11B-503.4
 2. Access aisles for passenger drop-off and loading zone shall be marked with a painted borderline around their perimeter. The area within the borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface. CBC Section 11B-503.3
 3. A vertical clearance of 9'-6" minimum shall be provided for vehicle pull-up spaces, access aisles, and a vehicular route serving them connecting a vehicular entrance and a vehicular exit. CBC Section 11B-503.5
- G. Bus loading zones and bus stops shall comply with CBC Sections 11B-209 and 11B-810.2 as follows:
1. Boarding and alighting areas shall be of 8' x 5' minimum, with 8' measured perpendicular to the curb or vehicle roadway edge, and with 5' measured parallel to the vehicle roadway. Slopes in 8' direction shall be 1:48 maximum. Slopes in 5' direction shall be the same as that of the roadway, to the maximum extent practicable. CBC Figure 11B-810.2.2
 2. Bus shelters shall provide a minimum 30" x 48" clear floor or ground space (36" x 48" or 36" x 60" as applicable in an alcove), with slopes not steeper than 1:48 in any direction, entirely within the shelter complying with CBC Section 11B-305.
- H. Bus shelters shall be connected by an accessible route complying with CBC Section 11B-402 to a boarding and alighting area complying with CBC Section 11B-810.2. CBC Figure 11B-810.3.
- I. Electric Vehicle Charging Stations 11B-228.3.
1. Where Electric Vehicle Charging Stations are provided, accessible EVCS shall be provided in accordance with CBC Section 11B-228.3, Table 11B-228.3.2.1 and 11B-812.

2. Vehicle spaces and access aisles serving them shall comply with CBC Section 11B-302. Access aisles shall be at the same level as the vehicle space they serve. Changes in level, slopes exceeding 1:48, and detectable warnings shall not be permitted in vehicle spaces and access aisles per CBC Section 11B-812.3.
3. Vehicle spaces for van accessible, standard accessible, ambulatory and drive-up EVCS shall meet minimum length and width requirements per CBC Section 11B-812.6. Accessible EVCS stalls shall be marked "EV Charging Only" per CBC Section 11B-812.9 and Figure 11B-812.9.
4. Access aisles for van accessible and standard accessible EVCS shall meet minimum length and width requirements and be marked per CBC Section 11B-812.7. The color of the perimeter, hatch lines and "No Parking" letters shall contrast with the surface color (blue color required for use at non-EVCS accessible parking shall not be used).

1.6 SUBMITTALS

- A. Section 01 30 00 - Submittals: Requirements for submittals.
- B. Product Data: Submit paint formulation for each type of paint.
- C. Manufacturer's Installation Instructions: Submit instructions for application temperatures, eradication requirements, application rate, line thickness, and any other data on proper installation.

1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with State of California Public Work's standard.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five years experience.
- B. Applicator: Company specializing in performing work of this section with minimum three years documented experience approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 40 00 - Quality Control: Requirements for transporting, handling, storing, and protecting products.
- B. Comply with AASHTO M309 for paint storage life, packaging and marking requirements. Invert containers several days prior to use when paint has been stored more than 2 months. Minimize exposure to air when transferring paint. Seal drums and tanks when not in use.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- B. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- C. Do not apply paint when temperatures are expected to fall below 60 degrees F for 24 hours after application.

- D. Volatile Organic Content (VOC). Do not exceed State or Environmental Protection Agency maximum VOC on traffic paint.

PART 2 PRODUCTS

2.1 PAINTED PAVEMENT MARKINGS

- A. Provide chlorinated rubber-alkyd type, 4" wide white color, except at parking spaces for persons with disabilities, which shall be blue in color equal to Color No. 15090 per Federal Standard 595c. Fire lane striping shall be red.
 - 1. Pavement-Marking Paint: MPI #32, alkyd traffic-marking paint.
 - 2. Glass Beads: AASHTO M 247, Type 1 made of 100 percent recycled glass.
 - 3. VOC Content: Pavement markings used on building interior shall have a VOC content of 150 g/L or less.
- B. Manufacturers:
 - 1. Kelly-Moore Paint Company, "Traffic Paint".
 - 2. Mercury Paint Company, "Traffic Paint".
 - 3. PPG, "Traffic and Zone Marking Paint".
 - 4. Substitutions: Under provisions of Section 01 60 00.
- C. Parking spaces for persons with disabilities shall be marked according to CBC Section 11B-502.

2.2 EQUIPMENT

- A. For application of crosswalks, intersections, stop lines, legends and other miscellaneous items by walk behind strippers, hand spray or stencil trucks, apply with equipment meeting requirements of this section. Do not use hand brushes or rollers.

2.3 TACTILE DETECTABLE WARNING DEVICES

- A. Prefabricated high impact plastic truncated dome tiles, yellow in color equal to Color No. 33538 of SAE AMS-STD-595A, conforming to the requirements of CBC Section 11B-705.1.
- B. Manufacturers:
 - 1. Tectura Designs, a Wausau Tile Inc. brand
Phone: 800-388-8728 (715) 359-3121 Fax: (715) 359-7456
E-mail: info@tectura designs.com Website: www.tectura designs.com
 - a. 12" ADA-2 Tile paver
 - 2. Substitutions: Under provisions of Section 01 60 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Do not apply paint to paving surfaces until paving has cured for 28 days.
- C. Beginning of installation means acceptance of existing surfaces.

3.2 PREPARATION

- A. Surface Preparation.

1. Clean and dry paved surface prior to painting.
2. Blow or sweep surface free of dirt, debris, oil, grease or gasoline.
3. Spot location of final pavement markings as specified and as indicated on Drawings.
4. Notify Construction Manager after placing pavement spots and minimum 3 days prior to applying traffic lines and markings.

3.3 EXISTING WORK

- A. Remove existing markings in an acceptable manner. Do not remove existing pavement markings by painting over with blank paint. Remove by methods that will cause least damage to pavement structure or pavement surface. Satisfactorily repair any pavement or surface damage caused by removal methods.
- B. Clean and repair existing remaining and reinstalled lines and legends.

3.4 APPLICATION

- A. Agitate paint for 1-15 minutes prior to application to ensure even distribution of paint pigment.
- B. Dispense paint at Manufacturer's recommended temperature to provide opaque coverage when dry.
- C. Lay out line markings and other painting in accordance with Drawings. Lines shall be 4 inches wide unless otherwise noted on drawings. Parking stalls for persons with disabilities shall be marked according to CBC Section 11B-502.
- D. Prevent splattering and over spray when applying markings.
- E. Protect markings from traffic until track free. When vehicle crosses a marking and tracks it or when splattering or over spray occurs, eradicate affected marking and resultant tracking and apply new markings.
- F. Collect and legally dispose of residues from painting operations.

3.5 APPLICATION TOLERANCES

- A. Section 01 40 00 - Quality Control: Tolerances.
- B. Maximum Variation from Wet Paint Line Width: Plus or minus 1/8 inch.

3.6 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Control: Field inspecting, testing, adjusting, and balancing.
- B. Inspect for incorrect location, line width, coverage, retention, uncured or discolored material, and insufficient bonding.
- C. Repair lines and markings, which after application and curing do not meet following criteria:
 1. Incorrect Location: Remove and replace incorrectly placed patterns.
 2. Insufficient Thickness, Line Width or Paint Coverage: Prepare defective material by acceptably grinding or blast cleaning to remove substantial amount of beads and to roughen marking surface. Remove loose particles and debris. Apply new markings on cleaned surface in accordance with this Section.
 3. Uncured or Discolored Material, Insufficient Bonding: Remove defective markings in accordance with this Section and clean pavement surface one foot beyond affected area. Apply new markings on cleaned surface in accordance with this Section.

- D. Replace defective pavement markings as specified throughout warranted period. Replace markings damaged by anti-skid materials, chemical deicers or other loss of marking material regardless of cause.
- E. Replace failed or defective markings in entire section of defective markings within 30 days after notification when the following exists during warranty period:
 - 1. Marking is discolored or exhibits pigment loss, and is determined to be unacceptable.
- F. Replace pavement marking material under warranty using original or better type material. Continue warranty to end of original period even when replacement materials have been installed as specified.
- G. When eradication of existing paint lines is necessary, eradicate by shot blast or water blast method. Do not gouge or groove pavement more than 1/16 inch during removal. Limit area of removal to area of marking plus 1 inch on all sides. Prevent damage to transverse and longitudinal joint sealers, and repair any damage according to industry standard.

3.7 PROTECTION OF FINISHED WORK

- A. Protect painted pavement markings from vehicular and pedestrian traffic until paint is dry and track free. Follow Manufacturer's recommendations. Barrier cones will be considered satisfactory protection for materials requiring more than 2 minutes dry time.

3.8 TACTILE DETECTABLE WARNING DEVICES

- A. Install truncated dome tiles as indicated on Drawings.
- B. Anchor permanently in place in accordance with manufacturer's directions.
- C. Detectable warning surfaces shall comply with CBC Section 11B-705.1.
- D. Detectable warning surfaces at transit boarding platform edges, bus stops, hazardous vehicular areas, reflecting pools, and track crossings shall be yellow and approximate to Federal Standard FS 33538 of SAE AMS-STD-595A. Detectable warning surfaces at other locations shall be either the aforementioned yellow or a color providing a 70 percent minimum visual contrast with that of adjacent walking surfaces. The material used to provide visual contrast shall be an integral part of the surface. CBC Section 11B-705.1.1.3.
- E. Detectable warning surfaces shall differ from adjoining surfaces in resiliency or sound-on-cane contact. Such constraint shall not be required for detectable warning surfaces at curb ramps, islands, or cut-through medians. CBC Section 11B-705.1.1.4.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCES & GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Galvanized fence framework, Galvanized fabric and Galvanized accessories.
- B. Excavation for post bases.
- C. Concrete anchorage for posts and center drop for gates.
- D. Manual gates and related hardware.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A123 - Zinc (Hot Galvanized) Coatings of Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips.
 - 2. ANSI/ASTM F567 - Installation of Chain Link Fence.
 - 3. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.
 - 4. ASTM C94 - Ready-Mixed Concrete.
- B. FS RR-F-191 - Fencing, Wire and Post, Metal.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in commercial quality chain link fencing with minimum three years of documented experience.
- B. Installation: ANSI/ASTM F567.
- C. Single Source Responsibility: Obtain chain link fences and gates, including accessories, fittings and fastenings, from a single source manufacture.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Include plan layout, grid, spacing of components, accessories, fittings, hardware, anchorages and schedule of components.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- D. Submit samples under provisions of Section 01 33 00.

PART 2 PRODUCTS

2.1 FABRIC

- A. Selvage: Knuckled on both selvages.
- B. Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing 12 feet and less in height to comply with Chain Link Fence Manufacturers Institute (CLFMI) "Product Manual" and with requirements indicated below.
 - 1. Mesh and Wire Size: 2-inch mesh, .148 inch diameter (9 gage).
 - 2. Coating: ASTM A 817, Type 2, Class 1, zinc-coated (galvanized) applied after weaving.

2.2 FRAMING

- A. Round member sized are given in actual outside diameter (OD) to the nearest thousandth of inches. Round fence posts and rails are often referred to in ASTM standard specifications by nominal pipe sizes (NPS) or the equivalent trade sizes in inches. The following indicates these equivalents all measured in inches:

<u>ACTUAL OD</u>	<u>NPS SIZE</u>	<u>TRADE SIZE</u>
1.315	1	1-3/8
1.660	1-1/4	1-5/8
1.900	1-1/2	2
2.375	2	2-1/2
2.875	2-1/2	3
3.500	3	3-1/2
4.000	3-1/2	4
6.625	6	6-5/8
8.625	8	8-5/8

- B. Type 1 Round Posts: Standard weight (schedule 40) galvanized-steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of the ASTM F 669, Group IA, with minimum yield strength of 25,000 psi, not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90, and weights per foot as follows:

ACTUAL OD	Weight (lb/ft)	NPS Size
1.315	1.68	1
1.660	2.27	1-1/4
1.900	2.72	1-1/2
2.375	3.65	2
2.875	5.79	2-1/2
3.500	7.58	3
4.000	9.11	3-1/2
6.625	8.97	6
8.625	28.55	8

C. Type 11 Round Posts: Cold-formed, electric-welded steel pipe conforming to heavy industrial requirements of ASTM F 669, Group IC, with minimum yield strength of 50,000 psi, either protective coating system below according to ASTM F 1234, and weights per foot as follows:

1. Coatings: Type B outside with a minimum of 0.9 oz. of zinc per sq. ft. after welding, a chromate conversion coating and a clear polymer overcoat. Type B inside with a minimum of 0.9 oz. of zinc per sq. ft. or Type D inside with a minimum 0.3-mil. thick, 81-percent zinc-pigmented nominal coating.
2. Coatings: Type C inside and outside with not less than 0.9 oz. of zinc-5 percent aluminum-mischmetal alloy per sq. ft.

ACTUAL OD	Weight (lb/ft)	NPS Size
1.315	1.35	1
1.660	1.84	1-1/4
1.900	2.28	1-1/2
2.375	3.12	2
2.875	4.64	2-1/2
3.500	5.71	3
4.000	6.56	3-1/2

D. Roll formed shapes will be considered for approval if they meet or exceed pipe requirements.

E. Top Rail, Center Rail, Bottom Rail: Manufacturers longest lengths (17 to 21 feet) with sleeved couplings approximately 6 inches long. Provide bands and rail ends for attaching rails securely to each gate, corner, pull and end posts.

1. Round Steel: 1.660-inch O.D. Type 1 or 11 steel pipe.
- F. Steel Posts:
1. Round line or intermediate posts; 2.375 inch O.D. Type 1 or 11 steel pipe or as detailed.
 2. End, Corner and Pull Posts; 2.875 inch O.D.. Type 1 or 11 steel pipe or as detailed.
- G. Swing Gate Post; Furnish posts to support single gate leaf or one leaf of a double gate sized a follows:
1. 2.875 inch O.D. pipe, Type 1 or 11 for gate leaves, 6 feet or less in height and opening of 5 feet or less in width.
 2. 4 inch O.D. pipe, Type 1 or 11 for gates leaves over 6 feet in height and to 12 feet in width.
 3. As Detailed.

2.3 FITTING AND ACCESSORIES

- A. Material: Comply with ASTM F 6.26 Mill-finished aluminum or galvanized iron or steel to suit manufacturer's standards.
1. Steel and Iron: Unless specified otherwise, hot-dip galvanize pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A 90.
- B. Corner, Terminal and Gate Post Caps: Provide weathertight closure cap for each post. Each cap shall be set screw retained or tack welded.
- C. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.
- D. Post Brace Assembly: Manufacturer's standard adjustable brace. Use materials specified below for brace, and truss to line posts with 3/8-inch diameter rod and adjustable tightener. Provide manufacturer's standard galvanized-steel or cast-iron cap for each end.
1. Round Steel: 1.660 inch OD Type 1 or 11 steel pipe.
- E. Center Rail and/or Bottom Rail: Provide manufacturer's standard galvanized-steel or cast-iron cap for each end.
- F. Tension or Stretcher Bars: Hot-dip galvanized steel with a minimum length 2 inches less than the full height of fabric, a minimum cross section of 3/16 inch by 3/4 inch, and a minimum of 1.2 oz. of zinc coating per sq. ft. Provided one bar for each gate and end post, and two for each corner and pull post.
- G. Tension and Brace Bands: 3/4 inch wide minimum hot dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq ft.
1. Tension Bands: 0.074 inch thick (14 gage) minimum.
 2. Brace Bands: 0.105 inch thick (12 gage) minimum.
- H. Tension Wire: 0.177 inch diameter metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric.
1. Coating Type 11 zinc in the following class as determined by ASTM A 90.
 - a. Class 3, with a minimum coating weight of 2.00 oz. per sq. ft. of uncoated wire surface.
- I. Tie Wires: 0.148 inch diameter (9 gage) galvanized steel with a minimum of 0.80 oz. per sq. ft. of zinc coating according to ASTM A 641, Class 3.

- J. Slats: PVC plastic vertical tubing, 10 yr. warranty color selection by architect from full color range. Maximum 3 separate colors.

2.4 CONCRETE

- A. Concrete: Provide concrete consisting of portland cement per ASTM C 150, aggregates per ASTM C 33, and potable water. Mix materials to obtain concrete with a minimum of 28 day compressive strength of 3,000 psi. Use at least four sacks of cement per cu. yd., 1-inch maximum size aggregate, 3-inch maximum slump.

2.5 GATES

- A. Fabricate perimeter frames of gates from same materials and finish as fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frames members maximum of 8 feet apart unless otherwise indicated.
 - 1. Fabric: Same as for fence unless otherwise indicated. Secure fabric at vertical edges with tension bars and bands and to top and bottom of frame with tie wire.
- B. Swing Gates: Comply with ASTM F 900.
 - 1. Steel Gates up to 8 feet wide.
 - a. Up to 6 feet high: Fabricate perimeter frames of 1.660 inch minimum OD Type 1 or 11 steel pipe.
 - b. Over 6 feet high: Fabricate perimeter frames of 1.90 inch minimum OD Type 1 or 11 steel pipe.
 - c. Gates that are part of the accessible route shall meet all the requirements of an accessible door in compliance with CBC Section 11B-404. .
 - 2. Gate Hardware: Provide galvanized hardware and accessories for each gate according to the following:
 - a. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180 degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 4 foot nominal height.
 - b. Latch: Forked type or plunger-bar type to permit operation from eight side of gate, with padlock eye as an integral part of latch.
 - c. Keeper: Where designated on plans.
 - d. Gate Stops: Provide gate stops for double gates, set in concrete, and designed to engage a center drop rod or plunger bar. Include a locking devise and padlock eyes as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.
 - e. Plunger Bar: At pairs to permit operation from each side of gate.
 - f. The levers of lever actuated latches or locks for accessible gates shall be curved with a return to within ½” of the gate surfaces to prevent catching on the clothing or persons. California Referenced Standards Code. T-24 Part 12, Section 12-10-202, Item (F).
 - g. Swing doors and gate surfaces within 10” of the finish floor or ground shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16” of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped. CBC Section 11B-404.2.10

- C. Gates across an exit to a public way or to a safe dispersal area shall have panic hardware.
- D. All gates within fire lane shall utilize a 3/8 in. galvanized chain, 2'-0 in. long with District keyed padlock.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General: Install fence to comply with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.
 - 1. Apply fabric to outside of frame work. Install fencing on boundary lines inside of property line established by survey.
- B. Excavating: Drill or hand-excavate (using post-hole digger) holes for posts to diameter and spacing indicated, in firm, undisturbed or compacted soil.
 - 1. Unless otherwise indicated, excavate a 12 inch hole, depth approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.
- C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space a maximum of 10 feet o.c., unless otherwise indicated.
 - 1. Protect portion of posts above ground from concrete splatter. Check each post for vertical and top alignment, and hold in position during placement and finishing operation.
- D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.
- E. Center Rails and or Bottom Rails: Install center rails in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where necessary.
- F. Brace Assemblies: Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at mid-height of fabric on fences with top rail and at 1 foot below fabric height on fences without top rail. Install so posts are plumb when diagonal rod is tensioned.
- G. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120 inch diameter (11 gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.
- H. Fabric: Pull fabric taut and tie to posts, rail and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains under tension after pulling force is released.
- I. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull and gate posts with tension bands spaced not over 15 inches o.c.
- J. Tie Wires: Use wire of proper length to secure fabric firmly to posts and rails. Bend ends of wire to minimize hazard to persons or clothing.
- K. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends or bolts or score threads to prevent removal of nuts for added security.
- L. Install mow strips and curbs where indicated on drawings.

3.2 GATE INSTALLATION

- A. Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary. Install gates according to manufacturer's instructions, plumb, level, and secure.

3.3 ADJUSTING

- A. Gates: After repeated operation of completed installation equivalent to 3 days use by normal traffic readjust gates for optimum operating condition and safety. Lubricate operating equipment and clean exposed surfaces.

END OF SECTION

SECTION 33 11 16

SITE WATER DISTRIBUTION SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Site water distribution systems located at least 5 feet outside the building perimeter, extending to an existing water line or meter.

1.2 RELATED SECTIONS

- A. Section 31 23 17 Trenching
- B. Section 31 23 23 Fill
- C. Section 32 12 16 Asphaltic Paving
- D. Section 32 13 13 Concrete Paving

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable code for materials and installation of the Work of this Section.

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Submit product data indicating pipe, pipe accessories and drainage structure.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- D. Certificates: Certificates attesting that tests set forth in referenced publications have been performed, and the performance requirements have been satisfied.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01 70 00.
- B. Accurately record location of pipe runs, connections, catch basins, manholes, cleanouts, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement:
 - 1. ANSI:
 - a. ANSI B16.18 Cast Copper Alloy Solder Joint Pressure Fittings.
 - b. ANSI B18.5.2.1 M Metric Round Head Short Square Neck Bolts.

2. ASME:
 - a. ASME B16.3 Malleable Iron Threaded Fittings.
 - b. ASME B 16.4 Cast Iron Threaded Fittings.
 - c. ASME B16.22 Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - d. ASME B16.26 Cast Copper Alloy Fitting for Flared Copper Tubes.
 - e. ASME B18.2.2 Square and Hex Nuts (Inches Series).
 - f. ASME B18.5.2M Metric Round Head Square Neck Bolts.

3. ASTM:
 - a. ASTM A 47 Ferric Malleable Iron Castings.
 - b. ASTM A 48 Gray Iron Castings.
 - c. ASTM A 53 Pipe, Steel, Black and Hit-Dipped, Zinc-Coated Welded and Seamless.
 - d. ASTM A 307 Carbon Steel bolts and Studs. 60,000 psi Tensile Strength.
 - e. ASTM A 563 Ductile Iron Castings.
 - f. ASTM A 563 Carbon and Alloy Steel Nuts.
 - g. ASTM B 61 Steam or Valve Bronze Castings.
 - h. ASTM B 62 Composition Bronze or Ounce Metal Castings.
 - i. ASTM B 88 Seamless Copper Water Tube.
 - j. ASTM C 94 Ready-Mixed Concrete.
 - k. ASTM D 1527 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80.
 - l. ASTM D 1785 Poly Vinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80 and 120.
 - m. ASTM D 2235 Solvent Cement for ABS Plastic Pipe, and Fittings.
 - n. ASTM D 2241 PVC Plastic Pipe Fittings, Schedule 40.
 - o. ASTM D 2282 ABS Plastic Pipe.
 - p. ASTM D 2466 PVC Plastic Pipe Fittings, Schedule 40.
 - q. ASTM D 2468 ABS Plastic Pipe Fittings, Schedule 40.
 - r. ASTM D 2564 PVC Plastic Piping Systems.
 - s. ASTM D 2774 Underground Installation of Thermoplastic Pressure Piping.
 - t. ASTM D 2855 Making Solvent-Cemented Joints with PVC Pipe and Fittings.
 - u. ASTM D 3139 Joints Pressure Pipes Using Flexible Elastomeric Seals.
 - v. ASTM F 402 Safe Handling Of Solvent Cements, Primer and Cleaners Used for Joining Thermoplastic Pipes and Fittings.
 - w. ASTM F 477 Elastomeric Seals for Joining Plastic Pipes.

4. American Water Works Association (AWWA) Standards:
 - a. AWWA CI04/A21.4 Cement-Mortar Lining For Ductile-Iron Pipe and Fittings For Water
 - b. AWWA C110/ A21.10 Ductile-Iron and Gray- Iron Fittings, 3 inches through 48 inches, for Water and Other Liquids.
 - c. AWWA C111/A21.11 Rubber-Gasket Joints for Ductile-Iron pressure Pipe and Fittings.
 - d. AWWA CI53/A21.53 Ductile-Iron Compact Fittings, 3 inches through 16 inches, for Water and Other Liquids.
 - e. AWWA C500 Gate Valves for Water and Sewerage Systems.
 - f. AWWA C503 Wet- Barrel Fire Hydrants
 - g. AWWA C508 Swing-Check Valves for Waterworks Service, 2 inches through 24 inches NPS.
 - h. AWWA C509 Resilient-Seated Gate Valves for Water and Sewerage Systems.
 - i. A WWA C511 Reduced-Pressure Principal Backflow-Prevention Assembly.
 - j. AWWA C600 Installation of Ductile-Iron Water Mains and Their Appurtenances.
 - k. AWWA C651 Disinfecting Water Mains.
 - l. AWWA C800 Underground Service Line valves and Fittings.
 - m. AWWA C900 PVC Pressure Pipe, 4 inches through 12 inches, for Water Distribution.
 - n. AWWA M23 PVC Pipe - Design and Installation .

5. Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry:
 - a. MSS SP-80 Bronze Gate, Globe, Angle and Check Valves.

6. Uni-Bell PVC Pipe Association (UBPPA):
 - a. UBPPA UNI-B-3 Installation of PVC Pressure Pipe
 - b. UBPPA UNI-B-8 Direct Tapping of PVC Pressure Water Pipe.
 - c. UBPPA UNI-B-13 Standard Performance Specification on joined restrained devices for use with Poly Vinyl Chloride (PVC) Pipe.

7. Underwriters Laboratories Inc. (UL):
 - a. UL 246 Hydrants for Fire-Protection Service
 - b. UL 262 Gate Valves for Fire-Protection Service.
 - c. UL 312 Check Valves for Fire-Protection Service.
 - d. UL 789 Indicator Posts for Fire-Protection Service.

8. Provide all valves from the same manufacturer.

B. PRODUCT HANDLING

1. Store items above ground on platforms, skids, or other required supports.
2. Protect materials from direct sunlight.
3. Protect coating and linings on piping, fittings, and accessories from damage. Repair and/or replace damaged coatings or linings.

PART 2 PRODUCTS

2.1 DOMESTIC WATER PIPING, OUTSIDE BUILDING STRUCTURE:

- A. Domestic water piping, above ground shall be: Type K hard-drawn copper tubing ASTM B88. Where necessary, combination of fittings, reducers and adapters shall be employed in making up the piping using wrought copper fittings. Cast fittings will not be permitted except as specified under "Valves. Use "lead free" water pipe, solder and flux materials that meet the standards as outlined by the current Safe Drinking Water Act (SDWA).
- B. Domestic water piping, below ground, 4" and smaller shall be: PVC Schedule 80 pipe, ASTM D 1785, with Schedule 80 socket fittings, ASTM D 2467, NSF and IAPMO approved. Primer and solvent shall be as specified by pipe manufacturer. Pipe shall be colored white, labeled, and installed with approved metallic marker along entire length of pipe.
- C. Pipe sizes 6 inches and larger shall be PVC water main pipe material complying with ASTM D 1784 Cell Class 12454B and AWWA C900. Piping shall be plain end or gasket bell end, pressure class 200 (DR 14) with cast iron pipe equivalent OD.
- D. Poly Vinyl Chloride (PVC) Water Main Fittings shall be gray-iron or ductile iron conforming to AWWA C110/A21.10 or AWWA C153/A21.53 and shall have cement mortar lining conforming to AWWA C104/A2L4, standard thickness unless otherwise indicated on Drawings. Fittings shall be mechanical joints.

2.2 PVC JOINTS AND JOINTING MATERIALS:

- A. Pipe joints shall be push on as specified in ASTM D 3139
- B. Joints between pipe and metal fittings, valves, and other accessories shall be mechanical joints as specified in AWWA C111/A21.11.
- C. Provide each joint connection with an elastomeric gasket suitable for the bell or coupling installation.
- D. Gaskets for push on joints for pipe shall conform to ASTM F 477
- E. Gaskets for push on joints and compression type joints or mechanical joints for connections between pipes and metal fittings, valves, and other accessories shall be as specified in AWWA C111/A21.11.
- F. Sleeve-type mechanically coupled joints may be provided instead of push-on joints on plain-end PVC plastic joints. Comply with requirements of ASTM D 3139.

2.3 GATES VALVES FOR PVC:

- A. Non-rising stem type with double disc gates and mechanical joint ends conform to AWWA C500.
- B. Non-rising stem type with mechanical joints ends shall conform to AWWA C509.

- C. Valves designed for a working pressure of 175 psi shall be inside-screw type with operating nut, double disc or split wedge type gate. Valve shall be provided with mechanical joints as required for the pipe to which it is intended to connect.
- D. Valves with UL listing of 262 shall conform to AWWA C500. Valves shall open by counter-clockwise rotation of valve stem.
- E. Stuffing boxes shall be provided with O-ring stem seals and shall be bolted and constructed to permit easy removal of parts for repair.
- F. Sleeve type mechanical couplings may be provided instead of mechanical and push on joint ends.
- G. Valve ends and gaskets for connection to sleeve type mechanical couplings shall conform to specified requirements for the joint or coupling.

2.4 GATE VALVES IN VALVE PITS:

- A. Outside screw and yoke rising stem type valves with double disc gates and flanged ends shall conform to AWWA C500.
- B. Outside screw and yoke rising stem type valves with flanged ends shall conform to AWWA C509.
- C. Outside screw and yoke type Valves with double disc gates or split-wedge type gate and flanged ended ends shall be designed for 175 psi and conform to UL 262.
- D. Provide valves with hand wheels that open by counterclockwise rotation of the valve stem.
- E. Stuffing boxes shall be provided with O-ring stem seals and shall be bolted and constructed to permit easy removal of parts for repair.

2.5 Check Valves for PVC:

- A. Valves shall be swing-check type conforming to AWWA C508 or UL 312.
- B. Valves shall be provided with cast iron or steel body and cover, flanged ends and clear port opening.
- C. Valves shall be designed for a working pressure of 175 psi.

2.6 VALVE BOXES:

- A. Valve boxes shall be cast iron and painted with bituminous paint. Shaft shall be adjustable with the word "WATER" cast on the valve box cap. Box shaft shall be 5-1/4 inches minimum diameter. Provide either pedestrian or vehicular traffic type as required. Valve boxes shall be as manufactured by Alhambra Foundry Company, or equal.

2.7 FILL MATERIAL

- A. Sand: Type specified in Section 31 05 16.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that trench cut is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings.
- B. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fill material of sand.
- B. Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.

3.3 INSTALLATION - PIPE

- A. Project site water lines shall terminate approximately 5 feet from buildings, unless otherwise indicated on Drawings. Temporarily cap or plug terminals for future connection to building.

3.4 CLEARANCES OF WATER LINE

- A. Building or Structures: 2 feet.
- B. Parallel to Sewer Line:
 - 1. Water line 5 inches or less in diameter shall not be installed in a common trench with the building sanitary drain unless the bottom of the water line is at least 12 inches above the top of the building sanitary drain or where the water line is installed on a solid shelf excavated on one side of the common trench with a minimum clear horizontal distance of 12 inches from the building sanitary drain.
 - 2. Water mains larger than 5 inches in diameter shall be separated from the Project site sanitary sewer, receiving more than one building sanitary drain or acid pipeline, in accordance with the requirement of the State of California, Human and Welfare Agency, Department of Health Services.
- C. Crossing Sewer Line:
 - 1. A water main shall be separated from sanitary sewer in accordance with the requirements of the State of California Administrative Code, Title 22, Section 64630(e)(2), unless modified herein.
 - 2. Install water main a minimum of 12 inches clear, above or below a sanitary sewer.
 - 3. A water main greater than 5 inches in diameter, crossing under a Project site sanitary sewer line, shall be installed with all their joints located at least 1-0 feet away from each side of the sanitary sewer line.
 - 4. A water main greater than 5 inches in diameter, crossing over a Project site sanitary sewer line, shall be installed with all their joints located at least 4 feet away from each side of the sanitary sewer line.
- D. Install all water mains no closer than 10 feet horizontally clear from the edge of sewage leach fields, seepage pits and septic tanks.

3.5 PIPE INSTALLATION AND JOINING

- A. Remove fins and burrs from pipe and fittings.
- B. Clean piping, fitting, valves, and accessories before installing. Maintain items in a clean condition.
- C. Provide proper facilities for lowering sections of pipe into trenches. Do not drop into piping, fittings, or other materials into trenches. Accurately cut pipe and install without springing or forcing. Replace any piping or fitting that does not provide sufficient space for proper installation of joining material.
- D. Blocking or wedging between bells and spigots is not permitted. Install bell and spigot pipe with bell end pointing in the direction of flow.
- E. Install piping to the lines and grades indicated or required. Low points and dips are not permitted. Support piping at proper elevation and grade with secure and uniform supports. Wood support blocking is not permitted. Where sand cement slurry will not be furnished for backfill, install piping so that full length of each section of pipe and each fitting will solidly rest on pipe bedding. Excavate recesses to accommodate bells, joints, and couplings. Provide anchors and supports where indicated or required for installation. Provide proper allowances and devices for expansion and contraction of piping and systems.
- F. Maintain trenches free of standing water until pipe joints have been installed.
- G. At the end of each day close open ends of pipe with temporary wood blocks or bulkheads.
- H. Do not install piping when trench or weather conditions prevent proper installation.

3.6 INSTALLATION OF TRACER WIRE AND PIPE MARKERS

- A. Tracer Wire: Install continuous length of tracer wire for full length of each run of nonmetallic pipe. Fasten wire to top of pipe in such a manner that it will not be displaced during construction operations. Wire shall be fastened to pipe at not greater than 20-foot intervals. Wire shall terminate above finished grade with a 12 inch lead taped around each riser. Provide a tracer wire to grade under a permanent marker where straight-line transitions of metallic to non-metallic pipe are installed.
- B. Underground Pipe Markers: Provide markers at grade where non-metallic pipe is installed and for each horizontal change in direction.

3.7 CONNECTIONS TO EXISTING WATER LINES

- A. After the Project Inspector has inspected installation, perform connections to servicing water lines. Schedule connection to provide the minimum interruption of existing services.
- B. Provide a tap or drilling machine with valve and mechanical joint type sleeves for connections to waterlines under pressure.
- C. Bolt sleeves around mains; bolt valve conforming to A WW A C500 to branch. Open valve, attach drilling machine, perform tap, close valve, and remove drilling machine, without interruption of service. Notify the IOR in writing at least 5 days prior to the date of scheduled connections.

3.8 INSTALLATION OF PVC PLASTIC WATER MAINS

- A. Unless otherwise indicated, install pipe and fittings as specified and in accordance with UBPPA UNI-B-3 and AWWA M23, Chapter 7, "Installation".
- B. Jointing:
 - 1. Provide push on joints with elastomeric gaskets specified for this type or joint, furnishing either elastomeric-gasket bell-end pipe or elastomeric-gasket couplings. For pipe-to-pipe push on joint connections, provide pipe with push on joint ends furnished with factory installed bevel; for push on joint connections to metal fittings, valves and other accessories, square cut spigot end of pipe end.
 - 2. Provide push on joint lubricant recommended by manufacturer.
 - 3. Install push on joints for pipe-to-pipe connections in accordance with UBPPA UNI-B-3 and AWWA M23, Chapter 7, "Installation."
 - 4. Install push on joints for connection to fittings, valves, and other accessories in accordance with requirements of UBPPA Uni-B-3 and with applicable requirements of AWWA C600.
 - 5. Compression-type joints/mechanical-joints with gaskets, glands, bolts, nuts and internal stiffeners shall be installed in accordance with the requirements of UBPPA UNI-B-3 and AWWA C600 and Appendix A to AWWA C 111/A21.11.
 - a. Square cut spigot off end of pipe for compression-type joint/mechanical-joint connections and do not re-bevel.
 - 6. Sleeve-type mechanical couplings shall be provided in strict accordance with coupling manufacturer's recommendations using internal stiffeners as specified for compression-type joints.
- C. Provide mechanical thrust restraint devices for anchorage and piping unless thrust blocks are indicated on the Drawings. Thrust blocks shall be installed in accordance with the requirements of UBPPA UNI-B-3 except that size and location of blocks shall be as indicated. Thrust blocks shall be provided as specified in Section 02770.

3.9 INSTALLATION OF VALVES

- A. Provide gate valves conforming to AWWA C 500 and UL 262 in accordance with AWWA C600 for valve and fitting installation and with recommendations of AWWA C500 Appendix "Installation, Operation, and Maintenance of Gate Valves".
- B. Provide gate valves conforming to AWWA C 600 in accordance with AWWA C 509 for valve and fitting installation and with recommendations of AWWA C 500 Appendix "Installation, Operation, and Maintenance of Gate Valves".
- C. Provide gate valves on PVC mater mains in accordance with A WWA M23 Chapter 7, "Installation."
- D. Provide check valves and fittings in accordance with applicable requirements of AWWA C600 unless noted otherwise on the Drawings.
- E. Provide gate and check valve joints as specified for the type of joints between pipe and fittings.

3.10 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. When water piping has been installed and tested. Sterilize system before use and/or Substantial Completion.
- B. Inject solution of liquid chlorine or sodium hypochlorite and water containing at least 50 PPM of free chlorine into a system in a manner to ensure that entire system is completely filled with solution. During this procedure operate valves and test outlets for residual chlorine. Continue injection until outlets indicate at least 59 PPM of free chlorine.
- C. After injection, isolate system and hold solution in retention for a period of at least 8 hours. Perform tests for residual chlorine after retention. If such tests indicate less than 50 PPM of residual chlorine, repeat entire procedure. After satisfactory sterilization has been verified, flush entire system until all traces of chlorine have been removed or until chlorine content is no greater than in existing water supply.

3.11 ELECTROLYSIS PREVENTION

- A. Insulating (dielectric) couplings or 6-inch long brass nipples shall be installed at locations specified or as required. Dielectric insulators shall be provided to insulate dissimilar metal to metal contact. Flanges shall be provided with a complete insulating component consisting of gasket bolt sleeves and bolt washers. Dielectric insulators shall be installed at locations indicated or as required.
- B. Where steel or cast iron below grade connects to copper or brass piping above grade, the transition from steel or cast iron pipe to copper or brass pipe shall be installed in an above grade accessible location.
- C. Underground dielectric connections shall be in accessible yard boxes.
- D. Above ground dielectric connections shall be exposed.

3.12 ABANDONING WATER LINES AND STRUCTURES

- A. Water lines and all appurtenances to be abandoned in place shall be cut and removed from all areas where new Work is being installed.
- B. Cap or plug abandoned existing drain lines in a code recognized manner.

3.13 TESTS AND INSPECTIONS

- A. Testing Procedure: Water mains and service lines shall be tested in accordance with applicable specified standard.
 - 1. Test PVC plastic water system in accordance with' UBPPA UNI-B-3 for pressure and leakage. The amount of leakage from PVC piping shall not exceed the amounts given in UBPPA UNI-B-3, except that no leakage is permitted for joints installed with sleeve type mechanical couplings.
 - 2. Test water service lines in accordance with applicable requirements of AWWA C 600. No leakage is permitted.
 - 3. Pressure testing: Before pressure test, soak portion of piping being tested with water for a minimum of 24 hours. Provide hydrostatic pressure of 50 psi greater than the maximum working pressure of tested system. Provide 200 psi hydrostatic test pressure for system piping of 2 inches in diameter and larger. Provide and maintain test pressure for at least 2 hours. Leakage test may be performed at same time as the pressure test.

3.14 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01 41 00.

3.15 PROTECTION

- A. Protect finished installation under provisions of Section 01 50 00.
- B. Protect pipe and filter aggregate cover from damage or displacement until backfilling operation is in progress.

3.16 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 33 31 10

SANITARY PVC SEWER SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Site sanitary sewer systems 2 feet away from the building wall, unless noted otherwise, to existing public and/or Project site sanitary sewer .

1.2 RELATED SECTIONS

- A. Section 31 23 17 Trenching
- B. Section 31 23 23 Fill
- C. Section 32 12 16 Asphaltic Paving
- D. Section 32 13 13 Concrete Paving

1.3 REFERENCES

- A. Conform to applicable code for materials and installation of the Work of this Section.
- B. ASTM D 3034 Type PSM Vinyl Poly Chloride (PVC) Sewer Pipe and Fittings
- C. ASTM F 679 Vinyl Poly Chloride (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
- D. AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. through 12 In., for Water Distribution.
- E. AWWA C905 Polyvinyl chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 In. through 36 In.
- F. ASTM D 2321 Underground Installation of Flexible Thermoplastic Sewer Pipe
- G. ASTM F 477 Elastomeric Seals (Gaskets) For Joining Plastic Pipe
- H. ANSI A21.10 Ductile-Iron and Gray-Iron Fittings 3 inches through 48 inches, for Water and Other Liquids
- I. ANSI A21.11 Rubber-Gasket Joints for Ductile-Iron and Gray Iron Pressure Pipe and Fittings

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Submit product data indicating pipe, pipe accessories and drainage structure.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- D. Certificates: Certificates attesting that tests set forth in referenced publications have been performed, and the performance requirements have been satisfied.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01 70 00.
- B. Accurately record location of pipe runs, connections, catch basins, manholes, cleanouts, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

- A. Standard Specifications for Public Works construction, current edition.
- B. California Plumbing Code, CPC, current edition.
- C. California Administrative Code, Title 22, Section 64630(e)(2).

PART 2 PRODUCTS

2.1 MATERIALS

- A. Site Sanitary Sewer:
 - 1. Provide PVC pipe and fittings complete with all necessary jointing facilities and materials, specials, adapters and other appurtenances required for installation in and completion of the pipelines to be constructed.
 - 2. Provide plain end or rubber gaskets (push-on or mechanical joint) of the types, sizes and classes shown or specified.
 - 3. Design Standards: Provide 4-inch through 15-inch PVC gravity sewer pipe and fittings meeting the requirements of ASTM D 3034. Provide 18-inch through 27-inch PVC gravity sewer pipe and fittings meeting the requirements of ASTM F 679. Provide 4-inch through 12-inch PVC pressure pipe meeting the requirements of ANSI/AWWA C900. Provide 14-inch through 36-inch PVC pressure pipe meeting the requirements of ANSI/AWWA C905.
 - 4. Provide pipe of the various sizes and classes as specified per the drawings. Restrain all pressure pipe joints.
 - 5. Construct concrete encasements where shown.
 - 6. Joints and Fittings for Gravity Sewer Pipe: Provide all fittings meeting the requirements of ASTM D 3034 and ASTM F 679. Provide joints that are a molded integral part of the pipe section. Do not use joints or couplings furnished loose. Provide joints with elastomeric gasket joints.
 - 7. Elastomeric Gasket Joints: Provide elastomeric gasket joints in accordance with ASTM F 477.
 - 8. Wall Thickness for Gravity Sewer:
 - a. 4 through 15 inches diameter - provide SDR-35 conforming to ASTM D 3034 for depth of cuts through 18 feet. Provide SDR-26 conforming to ASTM D 3034 for depth of cut over 18 feet.
 - b. 18 through 27 inches diameter - provide either T-1 or T-2 conforming to Table 1 in ASTM F 679.

- B. Cleanout Assemblies: Cleanout plug shall be line size.
1. In covered concrete-paved floors: Iron body with UPC recognized plug, top, and adjustable sleeve, cut-off ferrule, polished brass/nickel/bronze, and secured scoriated cover:

Square:	SMITH	JOSAM	ZURN
	4053	56030-2	Z-1400
Round:	SMITH	JOSAM	WADE
	4033	56010-2	W-6000
			ZURN
			Z-1400
 2. Outside covered concrete-paved floors: Secured cover, extra heavy-duty, adjustable sleeve, cut-off ferrule, UPC recognized brass type plug, scoriated tractor type cover:

SMITH	JOSAM	WADE	ZURN
4233	56050-2	Z-1402-HD	W-7030-Y
 3. In yard boxes: Raised threaded head brass plug. WADE 8590A, or equal.
- C. MANHOLE FRAME AND GRATE AND COVER
1. Precast reinforced concrete manhole top sections shall be produced using Type II Portland cement, or as approved by ENGINEER, and be fabricated in accordance with ASTM C478.. Manhole to meet AASHTO H-20 design requirements.
 2. Flexible plastic sealant, RAM-NEK, or equivalent, shall be required for all horizontal mating surfaces between precast top sections and precast slab tops of meter vaults.
 3. Manhole sections shall be clearly marked with the information specified for product marking in ASTM C478.
 4. Imperfections in the precast concrete manhole base or sections shall be reviewed by ENGINEER prior to repair.
- D. MANHOLE FRAME, GRATE AND COVER
1. Manhole frames and covers shall be three hundred and thirty-eight (338) pounds or greater, twenty-four-inch (24") inside diameter, as manufactured by D & L, Model A-1161 with closed pick hole or approved equal. Manhole cover to meet AASHTO H-20 design requirements.
 2. Frost proof covers if required shall be D & L, Model A-1019 with closed pick hole or approved equal. The ring and cover shall conform to ASTM A48/A48M Class 35B.
 3. Watertight frames and covers if required shall be NEENAH R-1915/R-1916 Series (as applicable) or approved equal.
- E. MANHOLE STEPS:
1. Manhole steps shall be polypropylene and be cast into the manhole wall at the same time the manhole section is cast.
 2. The manhole steps shall be approximately nine (9) inches wide and thirteen (13) inches long and weigh approximately two (2) pounds.
 3. The steps shall be located no more than twenty eight (28) inches from the top of the finished manhole nor more than eighteen (18) inches from the floor and be spaced no greater than twelve (12) inches apart.
 4. The step shall have a skid-resistant surface and be designed mechanically to prevent sideslip.

5. Joints: All precast concrete joints shall be made with a preformed joint sealer or grout. All joints that are made with the joint sealer shall also be pointed with mortar on the inside of the section.

a. Mortar:

1) Mortar used in jointing precast concrete manhole sections shall be composed of one (1) part Portland cement and not more than three (3) nor less than two (2) parts of fine aggregate. Portland cement shall meet the requirements of ASTM C150, Type II. Hydrated lime or masonry cement shall not be used.

2) Fine aggregate shall consist of well-graded natural sand having clean, hard, durable, uncoated grains, free from organic matter, soft or flaky fragments or other deleterious substances such as calcium chloride. The fine aggregate shall be thoroughly washed and shall be uniformly graded from coarse to fine with a minimum of ninety five percent (95%) passing the #4 sieve and a maximum of seven percent (7%) passing the #100 sieve.

3) All mortar shall be fresh for the WORK at hand. Mortar that has begun to set shall not be used.

b. Joint Seals: Precast concrete manhole section joint seals shall meet manufacturer's requirements

F. Yard Boxes: Brooks No. 3-TL, or equal, with cast-iron locking cover with the word "SEWER," embossed on the cover in one inch high upper case lettering.

G. Concrete, Mortar and Related Materials: Conform Site Concrete Work, unless noted otherwise.

H. Metal Covers, Frames and Accessories:

I. Conform to Section 206 - Miscellaneous Metal Items of the Standard Specifications for Public Works Construction.

J. Metal Covers and Frames: Vandal-resistant design and construction.

K. Hot-dip galvanize steel parts after fabrication and prior to assembly in accordance with Section 210 - -- Paint and Protective Coating of the Standard Specifications for Public Works Construction.

L. Bedding Materials: Conform to the requirements of Excavating, Backfilling and Compacting

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that trench cut is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings.

B. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with fill material of sand.

- B. Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.

3.3 PIPELINE INSTALLATION

- A. Install pipelines in a uniform alignment and slope to the point of connection as " , indicated. Before trench excavation, verify size, material, depth, and location of the point of connection.
- B. Unless indicated otherwise, pipe slope shall not be less than 1/4 inch per foot or 2 percent unless pipe inverts are indicated. Where invert elevations are indicated, install pipe at a uniform slope between inverts. Slope may be less upon the review of the Architect.
- C. Join pipes and fittings as recommended by the manufacturer.

3.4 CLEARANCES OF SANITARY PIPELINE

- A. Building or Structures: 2 feet.
- B. Parallel to Water Line:
 - 1. Building sanitary drain, starting 2 feet from the building wall to Project site sanitary sewer or public sewer, is not permitted to be installed in a common trench with the water line unless the bottom of the water line is at least 12 inches above the top of the sewer pipeline.
 - 2. In addition, the water piping shall be placed on a solid shelf excavated on one side of the common trench with a minimum clear horizontal distance of 12 inches from the sewer or drain line.
 - 3. Project site sanitary sewer, receiving more than one building sanitary drain or acid pipeline, shall be separated from the water line in accordance with the requirements of the State of California, Human and Welfare Agency, Department of Health Services.
- C. Crossing Water Line:
 - 1. Building sanitary drain shall be installed a minimum of 12 inches below the water line.
 - 2. Project site sanitary sewer shall be separated from the water main in accordance with the requirements of the State of California Administrative Code, Title 22, Section 64630(e)(2).

3.5 CLEAN OUTS

- A. Provide cleanout at the upper terminal for each sanitary pipeline, at intervals not exceeding 100 feet in straight run and any fraction thereof and for each aggregate horizontal change in direction exceeding 135 degrees.
- B. Install required cleanouts before back filling of horizontal pipelines.
- C. In unpaved and asphalt-paved areas, install cleanouts in yard boxes 2 inches below the yard box cover.
- D. In concrete-paved areas, extend cleanouts flush with finish grade.
- E. In traffic areas, install countersunk cleanout plugs where raised heads protrude.

3.6 ABANDONED SEWERS AND STRUCTURES

- A. Plug or cap every abandoned sanitary pipeline within 5 feet of the property line in a code required manner.

- B. Demolish abandoned structures such as cesspool, septic tank, sewage pit, and " manholes to a depth of 5 feet below the finish grade, including removal of sewage. Disconnect any piping. After inspection, completely fill with earth, sand, gravel, cement-sand slurry, or other required material.

3.7 TESTING

- A. After installation, test each sanitary pipeline and each section of the pipeline between successive manholes for either infiltration or exfiltration. Test shall be conducted in accordance with Section 306 - Underground Conduit Construction of the Standard Specifications for Public Works Construction.
- B. Where excessive ground water is encountered test the pipeline for infiltration.
- C. When infiltration or exfiltration exceeds allowable amounts as set forth in the Section 306 formula,, perform repairs or replacements as necessary to comply with the required limits.

3.8 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01 41 00.

3.9 PROTECTION

- A. Protect finished installation under provisions of Section 01 50 00.
- B. Protect pipe and filter aggregate cover from damage or displacement until backfilling operation is in progress.

3.10 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 33 41 00

STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Storm drainage piping, fittings, and accessories.
- B. Catch basins, paved area drainage, manhole access, and site surface drainage.

1.2 REFERENCES

- A. ANSI/ASTM A74 - Cast Iron Soil Pipe and Fittings.
- B. ANSI/ASTM C12 - Practice for Installing Vitrified Clay Pipe Lines.
- C. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- D. ANSI/ASTM C700 - Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated.
- E. ANSI/ASTM D3034 - Type PSM polyvinyl chloride (PVC) sewer and pipe fittings.
- F. ANSI/ASTM F477 - Elastomer seals (gaskets) for joining plastic pipe.
- G. ANSI/ASTM F810-85 - Smooth wall polyethylene pipe.
- H. ANSI/ASTM F892-89 - Polyethylene (PE) corrugated pipe with a smooth interior and fittings.
- I. ANSI/ASTM F894-89 - Polyethylene (PE) large diameter profile wall sewer and drain pipe.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable code for materials and installation of the Work of this Section.

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Submit product data indicating pipe, pipe accessories and drainage structure.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01 70 00.
- B. Accurately record location of pipe runs, connections, catch basins, manholes, cleanouts, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.1 STORM DRAIN PIPE MATERIALS

- A. Cast Iron Pipe: ANSI/ASTM A74; service type; bell and spigot end joints.
- B. Vitrified Clay Pipe: ANSI/ASTM C700; standard strength, unperforated; bell and spigot end joints.
- C. Reinforced Concrete Pipe: ANSI/ASTM C76, Class II with Wall Type B; mesh reinforcement; bell and spigot end joints.
- D. Plastic Pipe: ANSI/ASTM - D3034, type PSM polyvinyl chloride (PVC) material; bell and spigot end joints. Solvent sealed end joints.
- E. Polyethylene Corrugated Pipe: ANSI/ASTM - F892; Type III, Class C, (PE) material perforated; bell and spigot end joints.

2.2 PIPE ACCESSORIES

- A. Fittings: Same material as pipe, molded or formed to suit pipe size and end design, in required 'T' bends, elbows, cleanouts, reducers, traps, and other configurations required.

2.3 CATCH BASINS

- A. Basin Lid and Frame: Cast iron construction, hinged lid, linear grill lid design; nominal lid and frame size as indicated.
- B. Base Pad: Cast-in-place concrete of type specified in Section 03 30 00; leveled top surface sleeved to receive storm sewer pipe sections.

2.4 MANHOLES AND CLEANOUTS

- A. Lid and Frame: Cast iron construction, removable lid, closed lid design; nominal lid and frame diameter as indicated.
- B. Shaft Construction and Eccentric Code Top Section: Reinforced precast concrete pipe sections, lipped male/female dry joints; nominal shaft diameter as indicated.
- C. Base Pad: Cast-in-place concrete of type specified in Section 03 30 00; leveled top surface to receive concrete shaft sections, sleeved to receive sewer pipe sections.

2.5 FILL MATERIAL

- A. Sand: Type specified in Section 31 05 16.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that trench cut is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings.
- B. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fill material of sand.
- B. Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.

3.3 INSTALLATION - PIPE

- A. Install pipe, fittings and accessories in accordance with manufacturer's instructions. Seal joints watertight.
- B. Place pipe on minimum 4 inch deep bed of sand.
- C. Lay pipe to slope gradients noted on drawings, with maximum variation from true slope of 1/8 inch in 10 feet.
- D. Install coarse sand at sides and over top of pipe. Provide top cover to minimum compacted thickness of 12 inches.
- E. Place sand in maximum 6 inch lifts, consolidating each lift.
- F. Increase compaction of each successive lift. Refer to Section 31 23 23 for compaction requirements. Do not displace or damage pipe when compacting.

3.4 INSTALLATION - CATCH BASINS, MANHOLES, AND CLEANOUTS

- A. Form bottom of excavation clean and smooth to correct elevations.
- B. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe end sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated.
- D. Mount lid and frame in grout, secured to top cone section to elevation indicated.

3.5 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01 41 00.

3.6 PROTECTION

- A. Protect finished installation under provisions of Section 01 50 00.
- B. Protect pipe and filter aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION