

Project Manual

For

Merced Community College District Plant Science Modular Building

Los Banos Campus

Bidding and Contract Requirements
And
Specifications

for the

Merced Community College District
3600 M Street
Merced, CA 95348

Date: March 26, 2024

PBK Project No.: 230268

DSA Application No.: 02-121828

Construction Document

Project Manual

for:

Merced Community College District Plant Sciences Modular Building Los Banos Campus

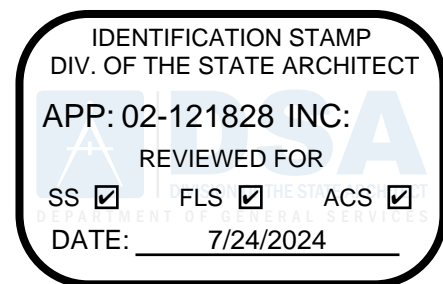
for the

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Construction Document

Consultants:

Architect:

PBK

1110 Iron Point Road
Suite 200
Folsom, CA 95630
Phone: (916) 682-9494

Civil:

Blair, Church & Flynn
Consulting Engineers
451 Clovis Avenue
Suite 200
Clovis, CA 93612
Phone: (559) 326-1400

Electrical:

LEAF Engineering

1110 Iron Point Road
Suite 200
Folsom, CA 95630-8315
Phone: (916) 355-9922



Project Manual Cover Sheet and Seal Page.

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**MERCED COMMUNITY COLLEGE DISTRICT
 BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR
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NOTICE CALLING FOR BIDS

DISTRICT	MERCED COMMUNITY COLLEGE DISTRICT
PROJECT DESCRIPTION	BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR
PROJECT BUDGET	NA
LATEST TIME/DATE FOR SUBMISSION OF BID PROPOSALS	2:00 P.M. Thursday, December 19, 2024
LOCATION FOR SUBMISSION OF BID PROPOSALS	Merced College, Purchasing Office (Corner University Drive and West Community College Drive) 3600 M Street, Merced, California 95348
LOCATION FOR OBTAINING BID AND CONTRACT DOCUMENTS	https://www.mccd.edu/about-merced-college/divisions/admin-services/purchasing/bids/

NOTICE IS HEREBY GIVEN that the Merced Community College District (District), acting by and through its Board of Trustees, will receive up to, but not later than the above-stated date and time, sealed Bid Proposals for the Contract for the Work generally described as:

BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR

- Submittal of Bid Proposals. All Bid Proposals must be submitted on forms furnished by the District prior to the last time for submission of Bid Proposals and the District’s public opening and reading of Bid Proposals.
- Bid and Contract Documents. All Bid and Contract Documents are available through Merced College, through the link provided above.
- Documents Accompanying Bid Proposal. Each Bid Proposal shall be accompanied by: (i) the required Bid Security; (ii) Subcontractors List; (iii) Statement of Qualifications; (iv) Non-Collusion Affidavit; and (v) DIR Registration Verification.
- Project Budget. The Project Budget for the Work is set forth above. If bidding for the Work includes Alternate Bid Items, the selection of Alternate Bid Items for determination of the lowest priced Bid Proposal will be by priority of Alternate Bid Items, up to but not exceeding the Project Budget. If bidding for the Work does not include Alternate Bid Items, the Project Budget set forth above is for information purposes only.
- Pre-Bid Inquiries. Bidders may submit pre-bid inquiries or clarification requests. Bidders are solely and exclusively responsible for submitting pre-bid inquiries or clarification requests no later than **2:00 PM SEVEN (7) Calendar days** before the latest date for submittal of Bid Proposals. Pre-bid inquiries or clarification requests shall be submitted to. PurchasingBids@mccd.edu
- Prevailing Wage Rates. The Contractor and all Subcontractors shall pay not less than the applicable prevailing wage rate for the classification of labor provided by their respective workers to execute the Work. Copies of the prevailing wage rates in the locality where the Work is to be performed, entitled PREVAILING WAGE SCALE are available to any interested party on the INTERNET at https://www.dir.ca.gov/OPRL/statistics_research.html. In addition to compliance with prevailing

wage requirements, the successful Bidder shall comply with all other applicable provisions of the Labor Code, the California Code of Regulations and rulings or determinations of the California Department of Industrial Relations. During the Work and pursuant to Labor Code §1771.4(a)(4), the Department of Industrial Relations shall monitor compliance with prevailing wage rate requirements and enforce the Contractor's prevailing wage rate obligations.

7. Contractors' License Classification. Bidders must possess the following classification(s) of California Contractors License at the time that the Bid Proposal is submitted and at time the Contract for the Work is awarded: **B - General Building**. The Bid Proposal of a Bidder who does not possess a valid and in good standing Contractors' License in the classification(s) set forth above will be rejected for non-responsiveness. Any Bidder not duly and properly licensed is subject to all penalties imposed by law. No payment shall be made for the Work unless and until the Registrar of Contractors verifies to the District that the Bidder awarded the Contract is properly and duly licensed for the Work.
8. Contract Time. Completion of the Work shall be achieved within the time set forth in Contract Documents after the date for commencement of the Work established in the Notice to Proceed issued by the District. Failure to achieve Completion within the Contract Time will result in the assessment of Liquidated Damages as set forth in the Contract.
9. Bid Security. Each Bid Proposal shall be accompanied by Bid Security in an amount equal to TEN PERCENT (10%) of the maximum amount of the Bid Proposal, inclusive of the value of any additive Alternate Bid Item(s). A Bid Proposal not accompanied by Bid Security in the form and in the amount required is non-responsive and will be rejected by the District.
10. Payment Bond; Performance Bond. Prior to commencement of the Work, the Bidder awarded the Contract shall deliver to the District a Payment Bond and a Performance Bond issued by a California Admitted Surety in the form and content included in the Contract Documents in a penal sum equal to One Hundred Percent (100%) of the Contract Price. The Payment Bond and the Performance Bond shall be issued by a California Admitted Surety in the form and content included in the Contract Documents.
11. No Withdrawal of Bid Proposals. Bid Proposals shall not be withdrawn by any Bidder for a period of thirty (30) **days** after the opening of Bid Proposals. During this time, all Bidders shall guarantee prices quoted in their respected Bid Proposals.
12. Return of Executed Agreement. The Bidder awarded the Contract shall execute the Agreement and return the executed Agreement to the District within three (3) **calendar days** from the date of receiving notification that it is the Bidder to whom the Contract has been awarded. If the successful Bidder fails to return the executed Agreement pursuant to the foregoing, the District may declare the Bidder's Bid Security forfeited as damages caused by the failure of the Bidder to enter into the Contract and may thereupon award the Contract for the Work to the responsible Bidder submitting the next lowest Bid Proposal or may call for new bids, in its sole and exclusive discretion.
13. Job-Walk. The District will conduct a **Mandatory Job Walk on Wednesday, November 20, 2024**, beginning at **9:30 AM**. Contractors are to meet at the Los Banos Campus, Building A Lobby, 22240 HWY 152, Los Banos Ca. 93635, for conduct of the Job Walk. If the Job Walk is mandatory, the Bid Proposal submitted by a Bidder whose representative(s) did not attend the entirety of the Mandatory Job Walk will be rejected by the District as being non-responsive. Access to the Job Walk will be available to Bidders for ten (10) minutes after the scheduled start time of the Job Walk; no access to the Job Walk will be permitted thereafter. A Bidder whose representative(s) arrive at the Job Walk location more than ten (10) minutes after the scheduled start of the Job Walk will be denied access and will not be deemed to have attended the Job Walk.

[DISTRICT MAP HYPERLINK](#)

14. Waiver of Irregularities. The District reserves the right to reject any or all Bid Proposals or to waive any irregularities or informalities in any Bid Proposal or in the bidding.

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

Merced Community College District

Advertisement Publications: November 13, 2024 & November 20, 2024

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INSTRUCTIONS FOR BIDDERS

1. Preparation and Submittal of Bid Proposal.
 - 1.1. Bid Proposal Preparation. All information required by the bid forms must be completely and accurately provided. Numbers shall be stated in both words and figures where required in the bid forms; conflicts between a number stated in words and in figures are governed by the words. Partially completed Bid Proposals or Bid Proposals submitted on other than the bid forms included herein are non-responsive and will be rejected. Bid Proposals not conforming to these Instructions for Bidders and the Notice to Contractors Calling for Bids (“Call for Bids”) may be deemed non-responsive and rejected.
 - 1.2. Bid Proposal Submittal. Bid Proposals shall be submitted at the place designated in the Call for Bids in sealed envelopes bearing on the outside the Bidder’s name and address along with an identification of the Work for which the Bid Proposal is submitted. Bidders are solely responsible for timely submission of Bid Proposals to the District at the place designated in the Call for Bids.
 - 1.3. Date and Time of Bid Proposal Submittal. A Bid Proposal is submitted only if the outer envelope containing the Bid Proposal is marked with the Project title and is received by a District Purchasing Department representative for logging-in at (or before) the latest date and time for submittal of Bid Proposals. The official U.S. time-clock website: <https://www.time.gov/> is controlling and determinative as to the time of the Bidder’s submittal of the Bid Proposal. The foregoing notwithstanding, whether or not Bid Proposals are opened exactly at the time fixed in the Call for Bids, no Bid Proposals shall be received or considered by the District after it has commenced the public opening and reading of Bid Proposals; Bid Proposals submitted after such time are non-responsive and will be returned to the Bidder unopened.
2. Bid Security. Each Bid Proposal shall be accompanied by Bid Security in the form of: (i) cash, (ii) a certified or cashier’s check made payable to the District or (iii) a Bid Bond, in the form and included with the Contract Documents (the “Bid Security”) in at least the amount set forth in the Call for Bids. A Bid Proposal submitted without the required Bid Security is non-responsive and will be rejected. If the Bid Security is in the form of a Bid Bond, the Bidder’s Bid Proposal is deemed responsive only if the Bid Bond is in the form and content included herein and the Surety is an Admitted Surety Insurer under Code of Civil Procedure §995.120.
3. Documents Accompanying Bid Proposal; Signatures. The Bid Proposal and all other documents required to be submitted with the Bid Proposal shall be executed by an individual duly authorized to execute the same on behalf of the Bidder; failure of a Bid Proposal to conform to the foregoing will render the Bid Proposal non-responsive and rejected.
4. Bidder and Subcontractors’ DIR Registered Contractor Status. Each Bidder must be a DIR Registered Contractor when submitting a Bid Proposal. The Bid Proposal of a Bidder who is not a DIR Registered Contractor when the Bid Proposal is submitted will be rejected for non-responsiveness. All Subcontractors identified in a Bidder’s Subcontractors’ List must be DIR Registered contractors at the time the Bid Proposal is submitted. The foregoing notwithstanding, a Bid Proposal is not subject to rejection for non-responsiveness for listing Subcontractor the Subcontractors List who is/are not DIR Registered contractor(s) if such Subcontractor(s) complete DIR Registration pursuant to Labor Code §1771.1(c)(1) or (2). Further, a Bid Proposal is not subject to rejection if the Bidder submitting the Bid Proposal lists any Subcontractor(s) who is/are not DIR Registered contractors and such Subcontractor(s) do not become DIR Registered pursuant to Labor Code §1771.1(c)(1) or (2) prior to award of the Contract, the Bidder, if awarded the Contract, must request consent of the District to substitute a DIR Registered Subcontractor for any non-DIR Registered Subcontractor(s) pursuant to Labor Code §1771.1(c)(3) without adjustment of the Contract Price or the Contract Time.
5. Modifications or Withdrawal of Bid Proposal. Changes to the bid forms which are not specifically called for or permitted may result in the District’s rejection of the Bid Proposal as being non-responsive. No oral or telephonic modification of any submitted Bid Proposal will be considered.

After submittal of a Bid Proposal, a Bidder may modify or withdraw its Bid Proposal only by written request actually received by the District prior to the scheduled closing time for the receipt of Bid Proposals and the District's public opening and reading of Bid Proposals; written requests to withdraw or modify a submitted Bid Proposal received by the District after the scheduled closing time for receipt of Bid Proposals shall not be considered by the District, nor effective to withdraw such Bid Proposal.

6. Erasures; Inconsistent or Illegible Bid Proposals. Erasures, interlineations or other corrections to any document submitted with a Bid Proposal shall be suitably authenticated by affixing in the margin immediately opposite such erasure, interlineations or correction the surname(s) of the person(s) signing the Bid Proposal. Any Bid Proposal not conforming to the foregoing may be deemed by the District to be non-responsive. If any Bid Proposal or portions thereof, is determined by the District to be illegible, ambiguous or inconsistent, the District may reject such a Bid Proposal as being non-responsive.
7. Examination of Site and Contract Documents. Each Bidder shall, at its sole cost and expense, inspect the Site and to become fully acquainted with the Contract Documents and conditions affecting the Work. Failure of a Bidder to receive or examine any of the Contract Documents or to inspect the Site shall not relieve such Bidder from any obligation with respect to the Bid Proposal, or the Work required under the Contract Documents. The District assumes no responsibility or liability to any Bidder for, nor shall the District be bound by, any understandings, representations or agreements of the District's agents, employees or officers concerning the Contract Documents or the Work made prior to execution of the Contract which are not in the form of Bid Addenda duly issued by the District. The submission of a Bid Proposal shall be deemed prima facie evidence of the Bidder's full compliance with the requirements of this section.
8. Agreement and Bonds. The Agreement which the successful Bidder, as Contractor, will be required to execute along with the forms Payment Bond, Performance Bond and other documents and instruments which are required to be furnished are included in the Contract Documents and shall be carefully examined by the Bidder.
9. Interpretation of Drawings, Specifications or Contract Documents. The District will respond to any pre-bid inquiry submitted in accordance with requirements established in the Call for Bids. If in the sole discretion of the District, a response to a pre-bid inquiry affects or potentially affects other Bidders, the Work, the Contract Documents or other requirements, the District will issue addenda. A copy of any such addendum will be delivered by fax, email or mail to each Bidder receiving a set of the Contract Documents. No person is authorized to render an oral interpretation or correction of any portion of the Contract Documents to any Bidder, and no Bidder is authorized to rely on any such oral interpretation or correction. Failure to request interpretation or clarification of any portion of the Contract Documents pursuant to the foregoing is a waiver of any discrepancy, defect or conflict therein.
10. District's Right to Modify Contract Documents. Before the public opening and reading of Bid Proposals, the District may modify the Work, the Contract Documents, or any portion(s) thereof by the issuance of written addenda disseminated to all Bidders who have obtained a copy of the Specifications, Drawings and Contract Documents pursuant to the Call for Bids. If the District issues any addenda during the bidding, the failure of any Bidder to acknowledge such addenda in its Bid Proposal will render the Bid Proposal non-responsive and rejected.
11. Bidders Interested in More Than One Bid Proposal; Non-Collusion Affidavit. No person, firm, corporation or other entity shall submit or be interested in more than one Bid Proposal for the same Work; provided, however, that a person, firm or corporation that has submitted a sub-proposal to a Bidder or who has quoted prices for materials to a Bidder is not disqualified from submitting a sub-proposal, quoting prices to other Bidders or submitting a Bid Proposal for the proposed Work to the District. The form of Non-Collusion Affidavit included in the Contract Documents must be completed

and duly executed on behalf of the Bidder; failure of a Bidder to submit a completed and executed Non-Collusion Affidavit with its Bid Proposal will render the Bid Proposal non-responsive.

12. Award of Contract.

- 12.1. Waiver of Irregularities or Informalities. The District reserves the right to reject any and all Bid Proposals or to waive any irregularities or informalities in any Bid Proposal or in the bidding.
- 12.2. Award to Lowest Responsive Responsible Bidder. The award of the Contract, if made by the District through action of its Board of Trustees, will be to the responsible Bidder submitting the lowest responsive Bid Proposal on the basis of the Base Bid Proposal and Alternate Bid Items selected in accordance with these Instructions.
- 12.3. Selection of Alternate Bid Items. Additive Alternate Bid Items (“ALT”), if any, will be accepted by the District in the order of priority established by the District, with the highest prioritized ALT being ALT 1. The Contract for the Work will be awarded to the Bidder submitting the lowest priced responsive Bid Proposal for the Base Bid scope and the maximum number of ALTs up to but not exceeding the Project Budget set forth in the Call for Bids. In the following example, Bidder B proposes \$19,000 for the Base Bid plus ALTs 1-3, Bidder A proposes \$20,000 and Bidder C proposes for the Base Bid plus ALTs 1-3. Pricing for the Base Bid and ALT 4 to any Bidder exceeds the Project Budget. Hence: Bidder B submitted the lowest priced proposal for the Base Bid and the maximum number of ALTs within the Project Budget.

Project Budget: \$19,000 (EXAMPLE)						
	BID PRICING			BASE BID + ALTS		
	BIDDER A	BIDDER B	BIDDER C	BIDDER A	BIDDER B	BIDDER C
Base Bid	\$5,000	\$5,500	\$4,800	\$5,000	\$5,500	\$4,800
ALT 1	\$8,000	\$7,500	\$7,800	\$13,000	\$13,000	\$12,600
ALT 2	\$1,000	\$1,000	\$1,200	\$14,000	\$14,000	\$13,800
ALT 3	\$6,000	\$5,000	\$7,000	\$20,000	\$19,000	\$20,800
ALT 4	\$150	\$120	\$200	\$20,150	\$19,150	\$21,000

- 12.4. Alternate Bid Items Not Included in Award of Contract. Bidders are referred to the provisions of the Contract Documents permitting the District, during performance of the Work, to add or delete from the scope of the Work any or all of the Alternate Bid Items with the cost or credit of the same being the amount(s) set forth by in the Alternate Bid Items Bid on the Proposal.
- 12.5. Responsive Bid Proposal. A responsive Bid Proposal shall mean a Bid Proposal which conforms, in all material respects, to requirements of the Bid and Contract Documents.
- 12.6. Responsible Bidder. Determination of the responsibility of Bidders is based on the following evaluation criteria.
 - 12.6.1. Bidder Capacity. Factors affecting the Bidder’s capacity to perform and complete the Work will be assessed, including: (i) Bidder’s access to labor, materials and other resources necessary to complete the Work; (ii) Bidder’s ability to complete the Work within the time established for completion of tchahe Work, or portions thereof; and (iii) Bidder’s ability to complete warranty obligations.
 - 12.6.2. Bidder Character, Integrity. Factors reflecting the character and integrity of the Bidder, including: (i) other public agency finding/determination, within the past five (5) years, that the Bidder is not responsible; (ii) currently debarred from bidding public works projects or

debarment from bidding within past five (5) years; and (iii) false claims liability within the past five (5) years under local, state or federal laws.

12.6.3. Bidder Financial Capability. Factors considered include: (i) sufficiency of the Bidder's financial resources; (ii) whether the Bidder is current in payment of debts and performance of other financial obligations; and (iii) bankruptcy or insolvency proceedings have been instituted within the past five (5) years.

12.6.4. Bidder Prior Performance. The Bidder's prior performance on prior public works contracts, including without limitation: (i) cost overruns; (ii) compliance with general conditions and other contractual requirements, including schedule development, schedule updates and coordination of labor, material/equipment procurements and subcontractors; (iii) completion within allocated time; (iv) submittal of unsubstantiated, unsupported or excessive cost proposals, claims or contract adjustment requests; (v) completion of a project by a surety; (vi) owner's exercise of default remedies; and (vii) finding or determination by any public agency that the Bidder is not a responsible bidder.

12.6.5. Safety. Factors include: (i) findings of serious or willful safety violations of safety laws, regulations or requirements by any local, state or federal agency within the past five (5) years; (ii) adequacy and implementation of safety plans, programs for on-site and off-site construction and construction related activities; and (iii) Workers Compensation Insurance EMR rating exceeding 1.25.

13. Subcontractors.

13.1. Designation of Subcontractors; Subcontractors List. Each Bidder shall submit a list of its proposed Subcontractors for the proposed Work as required by the Subletting and Subcontracting Fair Practices Act (California Public Contract Code §§ 4100 et seq.) on the form furnished. The failure of any Bid Proposal to include all information required by the Subcontractors List will result in rejection of the Bid Proposal for non-responsiveness.

13.2. Work of Subcontractors. All Bidders are referred to the Contract Documents and the notation therein that all Contract Documents are intended to be complimentary and that the organization or arrangements of the Specifications and Drawings shall not limit the extent of the Work of the Contract Documents. Accordingly, all Bidders are encouraged to disseminate all of the Specifications, Drawings and other Contract Documents to all persons or entities submitting sub-bids to the Bidder. The omission of any portion or item of Work from the Bid Proposal or from the sub-bidders' sub-bids which is/are necessary to produce the intended results and/or which are reasonably inerrable from the Contract Documents is not a basis for adjustment of the Contract Price or the Contract Time.

13.3 Subcontractor Bonds. In accordance with California Public Contract Code §4108, if a Bidder requires a bond or bonds of its Subcontractor(s), whether the expense of procuring such bond or bonds are to be borne by the Bidder or the Subcontractor(s), such requirements shall be specified in the Bidder's written or published request for sub-bids. Failure of the Bidder to comply with these requirements shall preclude the Bidder from imposing bonding requirements upon its Subcontractor(s) or rejection of a Subcontractor's bid under California Public Contract Code §4108(b).

14. Workers' Compensation Insurance. Pursuant to California Labor Code § 3700, the successful Bidder shall secure Workers' Compensation Insurance for its employees engaged in the Work of the Contract. The successful Bidder shall execute and deliver to the District the form of Workers Compensation Certification included in the Contract Documents concurrently with such Bidder's delivery of the executed Agreement to the District.

15. Bid Security Return. The Bid Security of the Bidders submitting the three lowest priced Bid Proposals, the number being solely at the discretion of the District, will be held by the District for

ten (10) days after the period for which Bid Proposals must be held open (which is set forth in the Call for Bids) or until posting by the successful Bidder(s) of the bonds, certificates of insurance required and return of executed copies of the Agreement, whichever first occurs, at which time the Bid Security of such other Bidders will be returned to them.

16. Contractor's License. No Bid Proposal will be considered from a Bidder who, at the time Bid Proposals are opened, is not licensed to perform the Work of the Contract Documents, in accordance with the Contractors' License Law, California Business & Professions Code §§7000 et seq. This requirement is not a mere formality and will not be waived by the District or its Board of Trustees. The required California Contractors' License classification(s) for the Work is set forth in the Call for Bids.
17. Non-Discriminatory Practices. It is the policy of the District that there be no discrimination against any prospective or active employee engaged in the Work because of race, color, ancestry, national origin, religious creed, sex, age, marital status or other legally protected classification. All Bidders agree to comply with the District's non-discrimination policy and all applicable Federal and California anti-discrimination laws including but not limited to the California Fair Employment & Housing Act beginning with California Government Code §§ 12940 et seq. and California Labor Code § 1735. In addition, all Bidders agree to require like compliance by any Subcontractor employed by them on the Work of the Contract.
18. Bidder's Qualifications. Each Bidder shall submit with its Bid Proposal the form of Statement of Bidder's Qualifications, which is included within the Contract Documents. All information required by Statement of Bidder's Qualifications shall be completely and fully provided. Any Bid Proposal not accompanied by the Statement of Bidder's Qualifications completed with all information required and bearing the signature of the Bidder's duly authorized representative under penalty of perjury will render the Bid Proposal non-responsive and rejected. If the District determines that any information provided by a Bidder in the Statement of Bidder's Qualifications is false or misleading, or is incomplete so as to be false or misleading, the District may reject the Bid Proposal submitted by such Bidder as being non-responsive.
19. Job-Walk. The District will conduct a Job-Walk at the time(s) and place(s) designated in the Call for Bids. The District may, in its sole and exclusive discretion, elect to conduct one or more Job-Walk(s) in addition to that set forth in the Call for Bids, in which event the District shall notify all Bidders who have theretofore obtained the Contract Documents pursuant to the Call for Bids of any such additional Job-Walk. If the District elects to conduct any Job-Walk in addition to that set forth in the Call for Bids, the District shall, in its notice of any such additional Job-Walk(s), indicate whether Bidders' attendance at such additional Job-Walk(s) is/are mandatory. If attendance at the Job Walk is indicated in the Call for Bids as being mandatory, the failure of any Bidder to have its authorized representative present at the entirety of the Job-Walk will render the Bid Proposal of such Bidder to be non-responsive. Where the Job-Walk is mandatory, a Bidder may have more than one authorized representative and/or representatives of its Subcontractors present at the Job-Walk; provided, however that attendance by representatives of the Bidder's Subcontractors without attendance by a representative of the Bidder shall not be sufficient to meet the Bidder's obligations hereunder and will render the Bid Proposal of such Bidder to be non-responsive. The District will reject the Bid Proposal of a Bidder who obtains the Bid and Contract Documents after the date of the Mandatory Job-Walks set forth in the Call for Bids unless a Job-Walk is requested by such Bidder and a Job-Walk is conducted by the District in accordance with the following provisions. The District may, in its sole and exclusive discretion, conduct such requested Job-Walk taking into consideration factors such as the time remaining prior to the scheduled opening of Bid Proposals. Any such requested Job Walk will be conducted only upon the requesting Bidder's agreement to reimburse the District for the actual and/or reasonable costs for the District's staff and its agents and representatives in arranging for and conducting such additional Job-Walk.

20. Public Records. Bid Proposals and other documents responding to the Call for Bids become the exclusive property of the District upon submittal to the District. At such time as the District issues the Notice of Intent to award the Contract pursuant to these Instructions for Bidders, all Bid Proposals and other documents submitted in response to the Call for Bids become a matter of public record and shall be thereupon be considered public records, except for information contained in such Bid Proposals deemed to be Trade Secrets (as defined in California Civil Code § 3426.1) and information provided in response to the Statement of Qualifications. A Bidder that indiscriminately marks all or most of its Bid Proposal as exempt from disclosure as a public record, whether by the notations of "Trade Secret," "Confidential," "Proprietary," or other similar notations, may result in, or render, the Bid Proposal non-responsive and rejected. The District is not liable or responsible for the disclosure of such records, including those exempt from disclosure if disclosure is deemed required by law, by an order of Court, or which occurs through inadvertence, mistake or negligence on the part of the District or its officers, employees or agents. At such time as Bid Proposals are deemed a matter of public record, pursuant to the above, any Bidder or other party shall be afforded access for inspection and/or copying of such Bid Proposals, by request made to the District in conformity with the California Access to Public Records Act, California Government Code §§6250, et. seq. If the District is required to defend or otherwise respond to any action or proceeding wherein request is made for the disclosure of the contents of any portion of a Bid Proposal deemed exempt from disclosure hereunder, the Bidder submitting the materials sought by such action or proceeding agrees to defend, indemnify and hold harmless the District in any action or proceeding from and against any liability, including without limitation attorneys' fees arising therefrom. The party submitting materials sought by any other party shall be solely responsible for the cost and defense in any action or proceeding seeking to compel disclosure of such materials; the District's sole involvement in any such action shall be that of a stakeholder, retaining the requested materials until otherwise ordered by a court of competent jurisdiction.
21. Drug Free Workplace Certificate. In accordance with California Government Code §§ 8350 et seq., the Drug Free Workplace Act of 1990, the successful Bidder will be required to execute a Drug Free Workplace Certificate concurrently with execution of the Agreement. The successful Bidder will be required to implement and take the affirmative measures outlined in the Drug Free Workplace Certificate and in California Government Code §§8350 et seq. Failure of the successful Bidder to comply with the measures outlined in the Drug Free Workplace Certificate and in California Government Code §§ 8350 et seq. may result in penalties, including without limitation, the termination of the Agreement, the suspension of any payment of the Contract Price otherwise due under the Contract Documents and/or debarment of the successful Bidder.
22. Notice of Intent to Award Contract. Following the public opening and reading of Bid Proposals, the District will issue a Notice of Intent to Award the Contract, identifying the Bidder to whom the District intends to award the Contract and the date/time/place of the District's Board of Trustees meeting at which award of the Contract will be considered.
23. Bid Protest.
- 23.1. Submittal of Bid Protest. Any Bidder submitting a Bid Proposal to the District may file a protest of the District's intent to award the Contract provided that all of the following are complied with: (i) the bid protest is in writing; (ii) the bid protest is filed and received by the District's Vice-President, Administrative Services not more than five (5) calendar days following the date of issuance of the District's Notice of Intent to Award the Contract; and (iii) the written bid protest sets forth, in detail, all grounds for the bid protest, including without limitation all facts, supporting documentation, legal authorities and argument in support of the grounds for the bid protest; any matters not set forth in the written bid protest shall be deemed waived. All factual contentions must be supported by competent, admissible and creditable evidence. Any bid protest not conforming to the foregoing shall be rejected by the District as invalid.

- 23.2. District Review and Disposition of Bid Protest. Provided that a bid protest is filed in strict conformity with the foregoing, the District's Vice-President, Administrative Services or such individual(s) as may be designated by him/her (Designee), shall review and evaluate the basis of the bid protest. The District's Vice-President, Administrative Services or Designee shall provide the Bidder submitting the bid protest with a written statement concurring with or denying the bid protest (Bid Protest Response). The Bid Protest Response is deemed the final action of the District and not subject to appeal or reconsideration by any other employee or officer of the District or the Board of Trustees of the District. The issuance of the Bid Protest Response by the District's Vice-President, Administrative Services or the Designee is an express condition precedent to the institution of any legal or equitable proceedings relative to the bidding process, the District's intent to award the Contract, the District's disposition of any bid protest or the District's decision to reject all Bid Proposals. If any such legal or equitable proceedings are instituted and the District is named as a party thereto, the prevailing party(ies) shall recover from the other party(ies), as costs, all attorneys' fees and costs incurred in connection with any such proceeding, including any appeal arising therefrom.

[END OF SECTION]

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BID PROPOSAL

Project: BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR

Bidder Name	_____	
Bidder Representative(s)	Name and Title _____	
	Name and Title _____	
Bidder Representative(s) Contact Information	Email Address(es)	Phone/Fax
	_____ _____	(_____) _____ Telephone (_____) _____ Fax
Bidder Mailing Address	Address _____	
	City/State/Zip Code _____	
California Contractors' License	Number _____	
	Classification(s) and Expiration Date _____	

1. **Bid Proposal.**
 - 1.1 **Bid Proposal Amount.** The undersigned Bidder proposes and agrees to perform the Contract including, without limitation, providing and furnishing any and all of the labor, materials, tools, equipment and services necessary to perform all obligations under the Contract Documents and to complete the Work required for the sum of _____ Dollars (\$_____).
 - 1.2 **Acknowledgment of Bid Addenda.** The Bidder confirms that this Bid Proposal incorporates and is inclusive of, all items or other matters contained in Bid Addenda issued by or on behalf of the District.
 _____ **Addenda Nos.** _____ received, acknowledged
 (initial) and incorporated into this Bid Proposal.
 - 1.3 **Alternate Bid Items.** The Bidder's proposed pricing for each Alternate Bid Item, if any, are set forth in the accompanying form of Alternate Bid Items Proposal. Failure of a Bidder to propose pricing for each Alternate Bid Item set forth in the accompanying Alternate Bid Items Proposal will result in the Bid Proposal being deemed non-responsive and rejected.
2. **Documents Accompanying Bid Proposal.** The Bidder has submitted with this Bid Proposal the following: (i) Bid Security; (ii) Subcontractors List; (iii) Statement of Qualifications; (iv) Non-Collusion Affidavit; and (v) DIR Registration Verification. The Bidder acknowledges that if this Bid Proposal and the foregoing documents are not fully in compliance with applicable requirements set forth in the Call for Bids, the Instructions for Bidders and in each of the foregoing documents, the Bid Proposal may be rejected as non-responsive.
3. **Award of Contract.** Concurrently with delivery of the executed Agreement to the District, the Bidder awarded the Contract shall deliver to the District: (i) Certificates of Insurance evidencing

all insurance coverages required under the Contract Documents; (ii) Performance Bond; (iii) Labor and Material Payment Bond; (ii) Certificate of Workers' Compensation Insurance; and (iv) Drug-Free Workplace Certificate. Failure of the Bidder awarded the Contract to strictly comply with the preceding may result in the District's rescinding award of the Contract and/or forfeiture of the Bidder's Bid Security.

4. Bidder Certifications. The Bidder certifies the following to the District:

4.1 Contractor License. The Bidder certifies that: (i) it possesses a valid and in good standing Contractors' License, in the necessary class(es), for performing the Work as set for in the Call for Bids; (ii) that such license shall be in full force and effect throughout the duration of the performance of the Work; and (ii) that all Subcontractors providing or performing any portion of the Work are properly licensed to perform their respective portions of the Work at the time of submitting this Bid Proposal and at all times during their performance of the Work.

4.2 DIR Registration. The Bidder certifies to the District that the Bidder is a DIR Registered contractor and that during the Work, the Bidder will verify that all subcontractors, of any tier performing any portion of the Work are DIR Registered contractors. All Work will be performed and completed by DIR Registered contractors.

5. Agreement to Bidding Requirements and Attorneys' Fees. The undersigned Bidder acknowledges and confirms its receipt, review and agreement with, the contractual requirements set forth in this Bid Proposal and the Contract Documents. By executing this Bid Proposal hereinbelow, the Bidder expressly acknowledges and agrees that if the Bidder institutes any legal or equitable proceedings in connection with this Bid Proposal and the District is named as a party thereto, the prevailing party(ies) shall recover from the other party(ies), as costs, all attorneys' fees and costs incurred in connection with any such proceeding, including any appeal arising therefrom. This provision shall constitute a binding attorneys' fee agreement in accordance with and pursuant to California Civil Code §1717 which shall be enforceable against the Bidder and the District. This attorneys fee provision shall be solely limited to legal or equitable proceedings arising out of a bid protest or the bidding process and shall not extend to or have any force and effect on the Contract for the Work or to modify the terms of the Contract Documents for the Work.

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

By: _____

(Signature of Bidder's Authorized Officer
or Representative)

(Typed or Printed Name)

Title: _____

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SUBCONTRACTORS LIST

Project ("the Work")	BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR
Bidder Name	_____
Bidder's Representative Signature	_____
	(Signature)

	(Typed or Printed Name)

Licensed Name of Subcontractor	Trade or Portion of Work	Address of Office, Mill or Shop	Subcontractor CSLB License No.	DIR Registration No.

DUPLICATE THIS PAGE AS NECESSARY FOR LISTING ADDITIONAL SUBCONTRACTORS

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**VERIFICATION OF CONTRACTOR AND
SUBCONTRACTORS' DIR REGISTRATION**

I am the _____ of _____ (“Bidder”)
(Title/Position) (Bidder Name)
submitting the accompanying Bid Proposal for the Work described as:

BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR

1. The Bidder is currently registered as a contractor with the Department of Industrial Relations (“DIR”).
2. The Bidder’s DIR Registration Number is: _____. The expiration date of the Bidder’s DIR Registration is June 30, 20____.
3. If the expiration date of the Bidder’s DIR Registration will occur prior to expiration of the Contract Time for the Work and the Bidder is awarded the Contract for the Work, prior to the Bidder’s DIR Registration expiration, the Bidder will take all measures necessary to renew the Bidder’s DIR Registration so that there is no lapse in the Bidder’s DIR Registration.
4. The Bidder, if awarded the Contract for the Work will remain a DIR registered contractor for the entire duration of the Work.
5. The Bidder has independently verified that each Subcontractor identified in the Subcontractors List is currently a DIR registered contractor.
6. The Bidder’s solicitation of subcontractor bids included notice to prospective subcontractors that: (i) all sub-tier subcontractors must be DIR registered contractors at all times during performance of the Work; and (ii) prospective subcontractors may only solicit sub-bids from and contract with lower-tier subcontractors who are DIR registered contractors.
7. If any of the statements herein are false or omit material facts rendering a statement to be false or misleading, the Bidder’s Bid Proposal is subject to rejection for non-responsiveness.
8. I have personal first hand-knowledge of all of the foregoing.

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

Executed this ____ day of _____, 20____ at _____
(City and State)

(Signature)

(Name, typed or printed)

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STATEMENT OF QUALIFICATIONS

1. Bidder Information.

1.1. Contact Information

Mailing Address	_____ Street Address _____ City, State, Zip Code
Physical Location (if different from mailing address)	_____ Street Address _____ City, State, Zip Code
Telephone/Fax	(____) _____ Telephone (____) _____ Fax

1.2. Bidder Contacts.

Name	_____
Contact Information	Telephone: (____) _____ Fax (____) _____ Email _____

1.3. California Contractors' License.

License Number(s)	_____
License Classification(s)	_____
Responsible Managing Employee; Responsible Managing Officer	_____
Expiration Date(s)	_____

1.4. Bidder Form of Entity.

- | | |
|--|--|
| <input type="checkbox"/> Corporation
<input type="checkbox"/> General Partnership
<input type="checkbox"/> Limited Partnership
<input type="checkbox"/> Limited Liability Company | <input type="checkbox"/> Limited Liability Partnership
<input type="checkbox"/> Joint Venture
<input type="checkbox"/> Sole Proprietorship |
|--|--|

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2. Revenue. Complete the following for the Applicant’s construction operations; if any portion of the revenue disclosed is generated by non-construction operations or activities, the Applicant must identify the portion of revenue attributed to construction operations and generally describe business activities of the Applicant that generates non-construction operations related revenue.

Calendar Year/ Fiscal Year	Annual Gross Revenue	Average Dollar Value of all Contracts	Dollar Value of Largest Contract
Choose an item.			
Choose an item.			
Choose an item.			

3. References.

DSA Project Inspectors			
Firm Name	Address	Telephone No.	Contact Name
Owners (K-12 school districts or community colleges preferred)			
Owner Name	Address	Telephone No.	Contact Name
Architects (K-12 or Community College Projects)			
Architect Firm Name & Architect Firm Contact Name	Address	Telephone No.	Contact Name

[CONTINUED NEXT PAGE]

4. Insurance.

<p>Commercial General Liability Insurance</p>	<p>Insurer: _____ Policy No. _____ Broker _____</p>
<p>Commercial General Liability Insurance Broker</p>	<p>(Contact Name) _____ _____ (Street Address) _____ _____ (City, State & Zip Code) _____ (_____) _____ (_____) _____ Telephone Fax _____ (Email address) _____</p>
<p>Bid, Performance and Labor & Materials Payment Bond Surety</p>	<p>Surety: _____ Surety Broker _____ _____ (Surety Broker Contact Name) _____ _____ (Street Address) _____ _____ (City, State & Zip Code) _____ (_____) _____ (_____) _____ Telephone Fax _____ (Email address) _____</p>
<p>Workers Compensation Insurance</p>	<p>Insurer: _____ Policy No. _____ Broker _____</p>
<p>Workers Compensation Insurance Broker</p>	<p>(Contact Name) _____ _____ (Street Address) _____ _____ (City, State & Zip Code) _____ (_____) _____ (_____) _____ Telephone Fax _____ (Email address) _____</p>

[CONTINUED NEXT PAGE]

5. Essential Requirements. A Bidder will not be deemed qualified if the answer to any of the following questions results in a “not qualified” response and the Bid Proposal submitted by such a Bidder will be rejected for non-responsiveness.

5.1. Bidder possesses a valid and currently in good standing California Contractors’ license for the Classification(s) of Contractors’ License required by the Call for Bids.

Yes No (Not Qualified)

5.2. Bidder is currently a DIR Registered contractor.

Yes No (Not Qualified)

5.3. Bidder has a current commercial general liability insurance policy with coverage limits which are equal to or greater than minimum coverage limits set forth in the Special Conditions.

Yes No (Not Qualified)

5.4. Bidder has a current workers’ compensation insurance policy as required by the Labor Code or is legally self-insured pursuant to Labor Code §3700.

Yes No (Not Qualified)
 Bidder is exempt from this requirement, because it has no employees

5.5. The Bidder ineligible or debarred from submitting Bid Proposals for public works projects or public works contracts pursuant Labor Code §1777.1 or Labor Code §1777.7.

Yes (Not Qualified) No

5.6. A public agency, within the past five (5) years conducted proceedings that resulted in a finding that the Bidder, or any predecessor to the Bidder, is not a “responsible” bidder for a public works project or a public works contract.

Yes (Not Qualified) No

5.7. During the last five (5) years, the Bidder or any predecessor to the Bidder, or any of the equity owners of the Bidder has been convicted of a federal or state crime involving fraud, theft, or any other act of dishonesty?

Yes (Not Qualified) No

5.8. During the past five (5) years a Surety has completed any project or the Bidder’s obligations under a construction contract.

Yes (Not Qualified) No

5.9. During the past five (5) years the Bidder has been declared in default under any construction contract to which the Bidder was a party.

Yes (Not Qualified) No

5.10. The Bidder’s Worker’s Compensation Insurance average Experience Modification Rating (“EMR”) rating over the past five (5) years is more than 1.25.

Yes (Not Qualified) No

5.11. The Bidder’s Workers Compensation Insurance EMR for the current policy term is more than 1.25.

Yes (Not Qualified) No

6. Accuracy and Authority. The undersigned is duly authorized to execute this Statement of Qualifications under penalty of perjury on behalf of the above-identified Bidder. The undersigned warrants and represents that he/she has personal knowledge of each of the responses to this Statement of Qualifications and/or that he/she has conducted all necessary and appropriate inquiries to determine the truth, completeness and accuracy of responses to this Statement of Qualifications. The undersigned declares and certifies that the responses to this Statement of Qualifications are complete and accurate; there are no omissions of material fact or information that render any response to be false or misleading and there are no misstatements of fact in any of the responses. The above-identified

Bidder acknowledges and agrees that if the District determines that any response herein is false or misleading or contains misstatements of fact so as to be false or misleading, the Bidder's Bid Proposal may be rejected by the District for non-responsiveness.

Executed this ___ day of _____ 20__ at _____
(City and State)

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

By: _____
(Signature of Bidder's Authorized Officer or Representative)

Title: _____
(Typed or Printed Name)

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NON-COLLUSION AFFIDAVIT

STATE OF CALIFORNIA
COUNTY OF _____

I, _____, being first duly sworn, deposes and says that I am
(Typed or Printed Name)

the _____ of _____, the party submitting
(Title) (Bidder Name)

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

1. The Bid Proposal is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization or corporation.

2. The Bid Proposal is genuine and not collusive or sham.

3. The Bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any other bidder or anyone else to put in sham bid, or to refrain from bidding.

4. The Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price, or that of any other bidder, or to fix any overhead, profit or cost element of the bid price or that of any other bidder, or to secure any advantage against the public body awarding the contract or of anyone interested in the proposed contract.

5. All statements contained in the Bid Proposal and related documents are true.

6. The bidder has not, directly or indirectly, submitted the bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any person, corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Executed this ____ day of _____, 20__ at _____.
(City, County and State)

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

Signature

Name Printed or Typed

(_____) _____
(Area Code and Telephone Number)

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CERTIFICATE OF WORKERS' COMPENSATION INSURANCE

I, _____ the _____ of
(Name) (Title)

_____, declare, state and certify that:
(Contractor Name)

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

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

(a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this state.

(b) By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer, or one employer in a group of employers, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his or her employees.”

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

(Contractor Name)

By: _____
(Signature)

(Typed or printed name)

DRUG-FREE WORKPLACE CERTIFICATION

I, _____, am the _____ of
(Print Name) (Title)

(Contractor Name)

I declare, state and certify to all of the following:

1. I am aware of the provisions and requirements of California Government Code §§8350 et seq., the Drug Free Workplace Act of 1990.
2. I am authorized to certify, and do certify, on behalf of Contractor that a drug free workplace will be provided by Contractor by doing all of the following:
 - A. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited in Contractor's workplace and specifying actions which will be taken against employees for violation of the prohibition;
 - B. Establishing a drug-free awareness program to inform employees about all of the following:
 - i. The dangers of drug abuse in the workplace;
 - ii. Contractor's policy of maintaining a drug-free workplace;
 - iii. The availability of drug counseling, rehabilitation and employee-assistance programs; and
 - iv. The penalties that may be imposed upon employees for drug abuse violations;
 - C. Requiring that each employee engaged in the performance of the Contract be given a copy of the statement required by subdivision (A), above, and that as a condition of employment by Contractor in connection with the Work of the Contract, the employee agrees to abide by the terms of the statement.
 - D. Contractor agrees to fulfill and discharge all of Contractor's obligations under the terms and requirements of California Government Code §8355 by, inter alia, publishing a statement notifying employees concerning: (i) the prohibition of any controlled substance in the workplace, (ii) establishing a drug-free awareness program, and (iii) requiring that each employee engaged in the performance of the Work of the Contract be given a copy of the statement required by California Government Code §8355(a) and requiring that the employee agree to abide by the terms of that statement.

3. Contractor and I understand that if the District determines that Contractor has either: (i) made a false certification herein, or (ii) violated this certification by failing to carry out and to implement the requirements of California Government Code §§8355, the Contract awarded herein is subject to termination, suspension of payments, or both. Contractor and I further understand that, should Contractor violate the terms of the Drug-Free Workplace Act of 1990, Contractor may be subject to debarment in accordance with the provisions of California Government Code §§8350, et seq.
4. Contractor and I acknowledge that Contractor and I are aware of the provisions of California Government Code §§8350, et seq. and hereby certify that Contractor and I will adhere to, fulfill, satisfy and discharge all provisions of and obligations under the Drug-Free Workplace Act of 1990.

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

Executed at _____ this ____ day of

1. (City and State)

_____, 20 ____.

(Signature)

(Printed or Typed Name)

AGREEMENT

THIS AGREEMENT is entered into [Click here to enter a date.](#) in the City of Merced, County of Merced, State of California, by and between **MERCED COMMUNITY COLLEGE DISTRICT**, a California Community College District hereinafter “District” and _____ (“Contractor”).

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

The Work. Within the Contract Time and for the Contract Price, subject to adjustments thereto pursuant to the Contract Documents, the Contractor shall perform and provide all necessary labor, materials, tools, equipment, utilities, services and transportation to complete in a workmanlike manner all of the Work required in connection with the work of improvement commonly referred to as:

BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR

1. Contractor shall complete all Work covered by the Contract Documents, including without limitation, the Drawings and Specifications prepared by the Architect, _____ and other Contract Documents enumerated in Article 5 below, along with all modifications and addenda thereto issued in accordance with the Contract Documents.
2. Contract Time. The Work shall be commenced on the date stated in the District’s Notice to Proceed; the Contractor shall achieve Completion of the Work within the Contract Time set forth in the Contract Documents.
3. Contract Price. The District shall pay the Contractor as full consideration for the Contractor’s full, complete and faithful performance of the Contractor’s obligations under the Contract Documents, subject to adjustments of the Contract Price in accordance with the Contract Documents, the Contract Price of _____ **Dollars** (\$_____). The District’s payment of the Contract Price shall be in accordance with the Contract Documents. The Contract Price is based upon the Contractor’s Base Bid Proposal and the following Alternate Bid Items, if any: _____.
4. Liquidated Damages. If the Contractor fails to achieve Completion of the Work within the Contract Time, including adjustments thereto authorized by the Contract Documents, the Contractor shall be subject to assessment of Liquidated Damages in accordance with the Contract Documents. Failure of the Contractor to complete Punchlist items noted upon Completion within the time established to complete the Punchlist items will result in the District’s assessment of Liquidated Damages in accordance with the Contract Documents.
5. The Contract Documents. The documents forming a part of the Contract Documents consist of the following, all of which are component parts of the Contract Documents.

Section	Description	Section	Description
00 01 10	Table of Contents	00 61 10	Bid Bond
00 11 13	Notice Calling for Bids	00 61 13	Performance Bond
00 21 13	Instructions for Bidders	00 61 14	Labor & Materials Payment Bond
00 41 22	Bid Proposal	00 62 90	Verification of Certified Payroll Records Submittal to Labor Commissioner
00 43 13	Bid Proposal; Alternate Bid Items Proposal	00 65 01	Conditional Waiver & Release on Progress Payment
00 43 36	Subcontractors List	00 65 02	Unconditional Waiver & Release on Progress Payment
00 45 10	DIR Registration Verification	00 65 03	Conditional Waiver & Release on Final Payment
00 45 13	Statement of Qualifications	00 65 04	Unconditional Waiver & Release on Final Payment
00 45 19	Non-Collusion Affidavit	00 65 36	Contractor Guarantee Form
00 45 23	Certificate of Workers Compensation Insurance	00 65 37	Contractor Certification of Subcontractor Claim
00 45 27	Drug-Free Workplace Certification	00 72 13	General Conditions

Section	Description	Section	Description
00 52 00	Agreement	00 73 13	Special Conditions

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

CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD. ANY QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR, CONTRACTORS' STATE LICENSE BOARD, P.O. BOX 2600, SACRAMENTO, CALIFORNIA 95826

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

District
Merced Community College District

By: _____
Title: _____

Contractor
[Contractor Name]

By: _____
Title: _____

BID BOND

KNOW ALL MEN BY THESE PRESENTS that we, _____, as Surety and _____, as Principal, are jointly and severally, along with their respective heirs, executors, administrators, successors and assigns, held and firmly bound unto **MERCED COMMUNITY COLLEGE DISTRICT** ("the Obligee") for payment of the penal sum hereof in lawful money of the United States, as more particularly set forth herein.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the Principal has submitted the accompanying Bid Proposal to the Obligee for the Work commonly described as **BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR**

WHEREAS, subject to the terms of this Bond, the Surety and the Principal are jointly and severally firmly bound unto the Obligee in the penal sum equal to Ten Percent (10%) of the maximum amount of the Bid Proposal submitted by the Principal to the Obligee, inclusive of amounts proposed for Alternate Bid Items, if any.

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

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

If suit or other proceeding is brought upon this Bond by the Obligee, the Surety and Principal shall be jointly and severally liable for payment to the Obligee all costs, expenses and fees

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incurred by the Obligee in connection therewith, including without limitation, attorneys' fees.
IN WITNESS WHEREOF, the Principal and Surety have executed this instrument this _____ day of _____, 20____ by their duly authorized agents or representatives.

(Bidder/Principal Name)

By: _____
(Signature)

(Typed or Printed Name)

Title: _____

(Attach Notary Public Acknowledgement of Principal's Signature)

(Surety Name)

By: _____
(Signature of Attorney-In-Fact for Surety)

(Typed or Printed Name of Attorney-In-Fact)

(Attach: (i) Attorney-In-Fact Certification; (ii) Notary Public Acknowledgment of Authorizing Signature on Attorney-Fact Certification; and (iii) Notary Public Acknowledgement of Attorney-In-Fact's Signature.)

Contact name, address, telephone number and email address for notices to the Surety

(Contact Name)

(Street Address)

(City, State & Zip Code)

(_____) _____ (_____) _____
Telephone Fax

(Email address)

PERFORMANCE BOND

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

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the Obligee, by resolution of its Board of Trustees has awarded to the Principal a Contract for the Work described as **BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR**

WHEREAS, the Principal, has entered into an agreement with the Obligee for performance of the Work; the Agreement and all other Contract Documents set forth therein are incorporated herein and made a part hereof by this reference.

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

NOW THEREFORE, if the Principal 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 shall indemnify, defend and hold harmless the Obligee and all of 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 the obligations of the Contract Documents, including all modifications, and amendments, thereto, and any warranties or guarantees required thereunder; then this obligation shall be void; otherwise, it shall be, and remain, in full force and effect.

The Surety, for value received, 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, or to the Specifications or the Drawings shall limit, restrict or otherwise impair Surety's obligations or Obligee's rights hereunder; Surety 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, 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 Principal's obligations thereunder, 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 ("the Notice of Election"); provided, however, that the procedure by which the Surety undertakes to discharge its obligations under this

[CONTINUED NEXT PAGE]

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 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.

If the Surety fails to issue its Notice of Election to Obligee within the time provided for hereinabove, the Obligee may thereafter cause the cure or remedy of the Principal's failure of performance or default or to complete the Work. The Principal and the Surety are 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 of the Work 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 or default under the Contract Documents is limited to the penal sum hereof, which includes the costs or value of any Changes to the Work which increases the Contract Price.

If suit or other proceeding is brought upon this Bond by the Obligee, the Surety and Principal are jointly and severally liable for payment to the Obligee of all costs, expenses and fees incurred by the Obligee therewith, including without limitation, attorneys' fees.

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

(Contractor-Principal Name)

By: _____
 (Signature)

 (Typed or Printed Name)

Title: _____

(Attach Notary Public Acknowledgement of Principal's Signature)

Contact name, address, telephone number and email address for notices to the Surety

 (Contact Name)

 (Street Address)

 (City, State & Zip Code)

(_____) _____ (_____) _____
 Telephone Fax

 (Email address)

(Surety Name)

By: _____
 (Signature of Attorney-In-Fact for Surety)

 (Typed or Printed Name of Attorney-In-Fact)

(Attach: (i) Attorney-In-Fact Certification; (ii) Notary Public Acknowledgment of Authorizing Signature on Attorney-Fact Certification; and (iii) Notary Public Acknowledgement of Attorney-In-Fact's Signature.)

LABOR AND MATERIAL PAYMENT BOND

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

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the Obligee, by resolution of its Board of Trustees has awarded to the Principal a Contract for the Work described as **BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR**

WHEREAS, the Principal, has entered into an Agreement with the Obligee for performance of the Work, the Agreement and all other Contract Documents set forth therein are incorporated herein by this reference and made a part hereof.

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

NOW THEREFORE, if the Principal shall promptly, fully and faithfully make payment: (i) to any Claimant for all labor, materials or services used or reasonably required for use in the performance of the Work; (ii) of amounts due under the Unemployment Insurance Code for work or labor performed under the Contract; and (iii) of amounts required to be deducted, withheld and paid to the Employment Development Department from wages of the employees of the Principal and its Subcontractors under Section 13020 of the Unemployment Insurance Code with respect to work and labor under the Contract then this obligation shall be void; otherwise, it shall be, and remain, in full force and effect.

The term "Claimant" shall refer to any person, corporation, partnership, proprietorship or other entity including without limitation, all persons and entities described in California Civil Code §9100, providing or furnishing labor, materials or services used or reasonably required for use in the performance of the Work under the Contract Documents, without regard for whether such labor, materials or services were sold, leased or rented. This Bond shall inure to the benefit of all Claimants so as to give them, or their assigns and successors, a right of action upon this Bond.

If suit is brought on this Bond by any Claimant for amounts due such Claimant for labor, materials or services provided or furnished by such Claimant, the Surety shall pay for the same and reasonable attorneys' fees pursuant to California Civil Code §9554.

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

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deletion, addition or other modification to the Contract Documents, the Work to be performed under the Contract Documents, the Drawings or the Specifications of any other portion of the Contract Documents.

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

(Contractor-Principal Name)

By: _____
(Signature)

(Typed or Printed Name)

Title: _____

(Attach Notary Public Acknowledgement of Principal's Signature)

(Surety Name)

By: _____
(Signature of Attorney-In-Fact for Surety)

(Typed or Printed Name of Attorney-In-Fact)

(Attach: (i) Attorney-In-Fact Certification; (ii) Notary Public Acknowledgment of Authorizing Signature on Attorney-Fact Certification; and (iii) Notary Public Acknowledgement of Attorney-In-Fact's Signature)

Contact name, address, telephone number and email address for notices to the Surety

(Contact Name)

(Street Address)

(City, State & Zip Code)

(_____) _____ (_____) _____
Telephone Fax

(Email address)

**VERIFICATION OF CERTIFIED PAYROLL RECORDS SUBMITTAL
TO LABOR COMMISSIONER**

I am the _____ for _____ in
(Superintendent/Project Manager) (Contractor)
connection with **BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR**

1. This Verification is submitted to Merced Community College District concurrently with the Contractor’s submittal of an Application for Progress Payment to the District, identified as Application For Progress Payment No. _____ (“the Pay Application”).
2. The Pay Application requests the District’s disbursement of a Progress Payment for the value of Work performed between _____, 20__ and _____, 20__.
3. The Contractor has submitted Certified Payroll Records (“CPR”) to the Labor Commissioner for all employees of the Contractor engaged in performance of Work subject to prevailing wage rate requirements for the period of time covered by the Pay Application.
4. All Subcontractors who are entitled to any portion of payment to be disbursed pursuant to the Pay Application have submitted their CPRs to the Labor Commissioner for all of their employees performing Work subject to prevailing wage rate requirements for the period of time covered by the Pay Application.
5. I have reviewed the Contractor’s CPRs submitted to the Labor Commissioner. The CPRs submitted to the Labor Commissioner by the Contractor are complete and accurate for the period of time covered by the Pay Application.
6. I have reviewed the Subcontractors’ CPRs submitted to the Labor Commissioner. The CPRs submitted to the Labor Commissioner by the Subcontractors are complete and accurate for the period of time covered by the Pay Application.

I declare under penalty of perjury under California law that the foregoing is true and correct. I executed this Certification on the ____ day of _____, 20__ at _____

(City) and State)

By: _____

(Typed or Printed Name)

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**CONDITIONAL WAIVER AND RELEASE
ON PROGRESS PAYMENT
(Civil Code §8132)**

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Identifying Information

Name of Claimant	
Name of Customer	
Job Location	
Owner	
Through Date	

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check	
Amount of Check	
Check Payable To	

Exceptions

This document does not affect any of the following:

1. Retentions.
2. Extras for which the claimant has not received payment.
3. The following payments for which the claimant has previously given a conditional waiver and release but has not received payment:
 Date(s) of waiver and release: _____
 Amount(s) of unpaid payment(s): _____
4. Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Signature

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

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**UNCONDITIONAL WAIVER AND RELEASE
ON PROGRESS PAYMENT
(Civil Code §8134)**

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Identifying Information

Name of Claimant	
Name of Customer	
Job Location	
Owner	
Through Date	

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has received the following progress payment: \$_____.

Exceptions

This document does not affect any of the following:

1. Retentions.
2. Extras for which the claimant has not received payment.
3. Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Signature

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

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**CONDITIONAL WAIVER AND RELEASE
ON FINAL PAYMENT
(Civil Code §8136)**

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Identifying Information

Name of Claimant	
Name of Customer	
Job Location	
Owner	
Through Date	

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following checks are drawn:

Maker of Check	
Amount of Check	
Check Payable To	

Exceptions

This document does not affect any of the following:
Disputed claims for extras in the amount of: \$ _____

Signature

Claimant's Signature: _____
Claimant's Title: _____
Date of Signature: _____

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**UNCONDITIONAL WAIVER AND RELEASE
ON FINAL PAYMENT
(Civil Code §8138)**

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Identifying Information

Name of Claimant	
Name of Customer	
Job Location	

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for all labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has been paid in full.

Exceptions

This document does not affect the following:
Disputed claims for extras in the amount of: \$ _____

Signature

Claimant's Signature: _____
Claimant's Title: _____
Date of Signature: _____

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Contractor Guarantee

District: Merced Community College District

Project Name: BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR

Contractor Name: _____

The Contractor hereby warrants and guarantees to the District that all work, materials, equipment and workmanship provided, furnished or installed by or on behalf of Contractor in connection with the above-referenced Project (the "Work") have been provided, furnished and installed in strict conformity with the Contract Documents for the Work, including without limitation, the Drawings and the Specifications. Contractor further warrants and guarantees that all work, materials, equipment and workmanship as provided, furnished and/or installed are fit for use as specified and fulfill all applicable requirements of the Contract Documents including without limitation, the Drawings and the Specifications. Contractor shall, at its sole cost and expense, repair, correct and/or replace any or all of the work, materials, equipment and/or workmanship of the Work, together with any other items which may be affected by any such repairs, corrections or replacement, that may be unfit for use as specified or defective within a period of one (1) year from the date of the District's Final Acceptance of the Work, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of the Contractor's failure and/or refusal to comply with the provisions of this Guarantee, within the period of time set forth in the Contract Documents after the District's issuance of the Notice to the Contractor of any defect(s) in the Work, materials, equipment or workmanship, Contractor authorizes the District, without further notice to Contractor, to repair, correct and/or replace any such defective item at the expense of the Contractor. The Contractor shall reimburse the District for all costs, expenses or fees incurred by the District in providing or performing such repairs, corrections or replacements within ten (10) days of the District's presentation of a demand to the Contractor for the same.

The provisions of this Guarantee and the provisions of the Contract Documents for the Work relating to the Contractor's Guarantee(s) and warranties relating to the Work shall be binding upon the Contractor's Performance Bond Surety and all successors or assigns of Contractor and/or Contractor's Performance Bond Surety.

The provisions of this Guarantee are in addition to, and not in lieu of, any provisions of the Contract Documents for the Work relating to the Contractor's guarantee(s) and warranties or any guarantee(s) or warranties provided by any material supplier or manufacturer of any equipment, materials or other items forming a part of, or incorporated into the Work, or any other guarantee or warranty obligation of the Contractor, prescribed, implied or imposed by law.

The undersigned individual executing this Guarantee on behalf of Contractor warrants and represents that he/she is duly authorized to execute this Guarantee on behalf of Contractor and to bind Contractor to each and every provision hereof.

Dated: _____

By: _____

(Signature)

(Typewritten or Handwritten Name)

(Title)

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CONTRACTOR CERTIFICATION OF SUBCONTRACTOR CLAIM

TO: MERCED COMMUNITY COLLEGE DISTRICT ("DISTRICT")

RE: **BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR (Project)**
YYYY (Contractor)
ZZZZ (Subcontractor)
Subcontractor Claim

This Contractor Certification of Subcontractor Claim is submitted by YYYY relating to **BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR** to the District on behalf of ZZZZ.

1. I am the _____ of the Contractor in connection with the above-described Project.
2. The Subcontractor has submitted the accompanying Subcontractor Claim to the Contractor for presentation to the District pursuant to Public Contract Code §9204.
3. I have personally reviewed the entirety of the Subcontractor Claim and all substantiating documentation in support of the Subcontractor Claim.
4. The Subcontractor Claim is made by the Subcontractor in good faith.
5. The Subcontractor Claim is supported by reasonable documentation establishing entitlement to the relief requested and District liability therefor.
6. 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.).
7. I am authorized: (i) to execute this Certification on behalf of the Contractor; and (ii) to submit this Certification and the accompanying Subcontractor Claim to the District.
8. I have personal first-hand knowledge of all of the foregoing.

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

Executed at _____, California, on _____, 20__.

(Signature)

(Print Name)

(Title)

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**GENERAL CONDITIONS
BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR**



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 - 4.7.2.3 Verification of Submittal Information.
 - 4.7.2.4 Information Included in Submittals.
 - 4.7.2.5 Contractor Responsibility for Deviations.
 - 4.7.2.6 No Performance of Work Without Architect Review.
 - 4.7.3 Architect Review of Submittals.
 - 4.7.4 Deferred Approval Items.
- 4.8 Materials and Equipment.
 - 4.8.1 Specified Materials, Equipment.
 - 4.8.2 Approval of Substitutions or Alternatives.
 - 4.8.3 Placement of Material and Equipment Orders.
 - 4.8.4 District's Right to Place Orders for Materials and/or Equipment.
 - 4.8.5 Contractor and Subcontractor
- Communication.
- 4.9 Safety.
 - 4.9.1 Safety Programs.
 - 4.9.2 Contractor Safety Plan.
 - 4.9.3 Safety Precautions.
 - 4.9.4 Safety Signs, Barricades.
 - 4.9.5 Safety Notices.
 - 4.9.6 Safety Coordinator.
 - 4.9.7 Emergencies.
 - 4.9.8 Hazardous Materials.
 - 4.9.8.1 General.
 - 4.9.8.2 Prohibition on Use of Asbestos Construction Building Materials ("ACBMs").
 - 4.9.8.3 Disposal of Hazardous Materials.
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 - 4.10.1 Documents at Site.
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- 4.14 Facilities and Information for the District's Inspector.
 - 4.14.1 Information to District's Inspector.
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 - 4.18.4.1 Maintenance of Certified Payroll Records.
 - 4.18.4.2 Submittal of Certified Payroll Records to Labor Commissioner.
 - 4.18.4.3 Inspection of Certified Payroll Records.
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 - 4.18.5.2 Penalty for Excess Hours.
 - 4.18.5.3 Contractor Responsibility.
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 - 4.18.6.1 Employment of Apprentices.
 - 4.18.6.2 Apprenticeship Certificate.
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- Funds.
- 4.18.6.6 Contractor's Compliance.
- 4.18.7 Employment of Independent Contractors.
- 4.19 Assignment of Antitrust Claims.
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 - 4.21.1 DSA Verified Reports: Contractor Actions.
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- 5.2 Subcontractor DIR Contractor Registration
 - 5.2.1 No Subcontractor Performance of Work Without DIR Registration.
 - 5.2.2 Contractor Obligation to Verify Subcontractor DIR Registration Status
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 - 5.3.1 Substitution Process.
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- 6.4 Insurance Requirements
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 - 6.4.4 District Additional Insured.
 - 6.4.5 Certifications of Insurance.
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 - 7.2.4 Contractor Responsibility for Multiple Inspections.
 - 7.2.5 Final Acceptance
- 7.3 Construction Schedule.
 - 7.3.1 Submittal of Preliminary Construction Schedule.
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 - 7.3.3 Preparation and Submittal of Contract Construction Schedule.
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- 7.4 Adjustment of Contract Time.
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- 8.3.4.2 Untimely Disbursement of Progress Payments.
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- 8.3.7 Exclusions From Progress Payments.
- 8.3.8 Title to Work.
- 8.3.9 Substitute Security for Retention.
- 8.4 Final Payment.
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 - 8.4.3 Disbursement of Final Payment.
 - 8.4.4 Waiver of Claims.
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- 9.1 Changes in the Work.
- 9.2 Construction Change Directive.
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 - 9.5.1 Adjustment to Contract Price.
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- 9.5.1.3.1 Labor.
- 9.5.1.3.2 Materials and Equipment.
- 9.5.1.3.3 Construction Equipment.
- 9.5.1.3.4 Mark-up on Costs of Changes to the Work.
- 9.5.1.4 Contractor Maintenance of Records.
- 9.5.2 Adjustment to Contract Time.
- 9.5.3 Addition or Deletion of Alternate Bid Item(s).
- 9.6 Change Orders.
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- 9.8 Disputed Changes.
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- 9.10 Minor Changes in the Work.
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- 10.1 District's Right to Award Separate Contracts.
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- 11.1 Tests; Inspections; Observations.
 - 11.1.1 Contractor's Notice.
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- 12.1 Inspection of the Work.
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- 14.1 District's Right to Suspend Work.
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- 15.1 Termination for Cause.
 - 15.1.1 District's Right to Terminate.
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 - 15.1.3 Completion by the Surety.
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 - 15.1.5 Costs of Completion.
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- 16.1 Governing Law.
- 16.2 Marginal Headings; Interpretation.
- 16.3 Successors and Assigns.
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- 16.5 Severability.
- 16.6 No Assignment by Contractor.
- 16.7 Gender and Number.
- 16.8 Independent Contractor Status.
- 16.9 Notices.
- 16.10 Disputes; Continuation of Work.
- 16.11 Dispute/Claims Resolution.
 - 16.11.1 Public Contract Code §9204 Claims Resolution Procedures.
 - 16.11.1.1 Claim Defined.
 - 16.11.1.2 Claim Documentation.
 - 16.11.1.3 District Claim Review Statement.
 - 16.11.1.4 Meet and Confer.
 - 16.11.1.4.1 Meet and Confer Demand.
 - 16.11.1.4.2 Meet and Confer Statement.
 - 16.11.1.5 Non-Binding Mediation

- 16.11.1.5.1 Contractor Initiation.
- 16.11.1.5.2 Mediator Selection.
- 16.11.1.5.3 Mediation Procedures.
- 16.11.1.5.4 Mediation Costs.
- 16.11.1.5.5 Post-Mediation Disputed Claims.
- 16.11.1.5.6 Waiver.
- 16.11.2 Payment of Undisputed Claims.
- 16.11.3 Subcontractor Claims.
 - 16.11.3.1 Subcontractor Claim Submittal.
 - 16.11.3.2 Contractor Certification of Subcontractor Claim.
 - 16.11.3.3 District Review of Subcontractor Claim.
 - 16.11.3.4 Disputed Subcontractor Claims.
- 16.11.4 Government Code Claim Requirements.
- 16.11.5 Section 20104.4 Dispute Resolution Procedures; Claims Less Than \$375,000.
 - 16.11.5.1 Binding Arbitration of Claims Exceeding \$375,000
 - 16.11.5.1.1 JAMS Arbitration.
 - 16.11.5.2 Demand for Arbitration.
 - 16.11.5.3 Discovery.
 - 16.11.5.4 Arbitration Award.
 - 16.11.5.5 Arbitration Fees and Expenses.
 - 16.11.5.6 Limitation on Arbitrator.
- 16.11.6 Inapplicability to Bid Bond.
- 16.12 Limitation on Special/Consequential Damages.
- 16.13 Capitalized Terms.
- 16.14 Attorneys' Fees.
- 16.15 Provisions Required by Law Deemed Inserted.
- 16.16 Days.
- 16.17 Entire Agreement.

GENERAL CONDITIONS

ARTICLE 1: DEFINITIONS

- 1.1 District. The “District” refers to **Merced Community College District** and unless otherwise stated, includes the District’s authorized representatives, including the Project Manager, if a Project Manager is designated, the District’s Board of Trustees and the District’s officers, employees, agents and representatives.
- 1.2 Contractor. The Contractor is the person or entity identified as such in the Agreement; references to “Contractor” include the Contractor’s authorized representative.
- 1.3 Architect. The Architect is the person or entity identified as such in the Agreement; references to the “Architect” include, as required by context of usage, the Architect’s employees and authorized representative(s) and the Architect’s Consultants and their employees and authorized representative(s).
- 1.4 The Work. The Work is the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment or services provided or to be provided by the Contractor to fulfill the Contractor’s obligations under the Contract Documents. The Work may constitute the whole or a part of the Project.
- 1.5 The Project. The Project is the total construction of which the Work performed by the Contractor under the Contract Documents may be the whole or a part of the Project and which may include construction by the District or by separate contractors.
- 1.6 Surety. The Surety is the person or entity that executes, as surety, the Contractor’s Labor and Material Payment Bond and/or Performance Bond.
- 1.7 Subcontractors; Sub-Subcontractors. A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work. “Subcontractor” does not include a separate contractor to the District or subcontractors of any separate contractor. A Sub-Subcontractor is a person or entity of any tier, who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the Site. References to “Subcontractor” herein include all subcontractors of any tier.
- 1.8 Material Supplier. A Material Supplier is any person or entity who only furnishes materials, equipment or supplies for the Work without fabricating, installing or consuming them in the Work.
- 1.9 Drawings and Specifications. The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing generally, the design, location and dimensions of the Work and may include without limitation, plans, elevations, sections, details, schedules or diagrams. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards, criteria and workmanship for the Work and related services. The Drawings and Specifications are intended to delineate and describe the Work and its component parts so as to permit skilled and competent contractors to bid upon the Work and prosecute the same to completion.
- 1.10 Special Conditions; Supplemental Conditions. Special Conditions and/or Supplemental Conditions, if any are special or supplemental provisions, not otherwise provided for in the Agreement or the General Conditions.
- 1.11 Contract Documents. The Contract Documents consist of the Agreement between the District and the Contractor, Conditions of the Contract (whether General, Special, Supplemental or otherwise), Drawings, Specifications, including addenda thereto issued prior to execution of the Agreement and any other documents listed in the Agreement. The Contract Documents shall include modifications issued after execution of the Agreement. The Contract Documents form

the Contract for Construction.

- 1.12 Intent and Correlation of Contract Documents.
- 1.12.1 Work of the Contract Documents. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable therefrom as being necessary to produce the intended results. Organization of the Specifications into divisions, sections or articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Where any portion of the Contract Documents is silent and information appears elsewhere in the Contract Documents, such other portions of the Contract Documents shall control.
- 1.12.2 Technical Terms. Unless otherwise stated in the Contract Documents, words or terms which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.
- 1.12.3 Conflict in Contract Documents. Conflicts, inconsistencies or ambiguities in the Contract Documents shall be resolved by the Architect in accordance with Article 3.1.9 of the General Conditions; where conflicts or inconsistencies arise between the Drawings and the Specifications, in resolving such conflicts or inconsistencies, the Architect will be governed generally by the following standards: the Drawings are intended to describe matters relating to placement, type, quantity and the like; the Specifications are intended to describe matters relating to quality, materials, compositions, manufacturers and the like. If conflicts exist between portions of the Contract Documents regarding the quality of any item, product, equipment or materials, unless otherwise directed or authorized by the District, the Contractor shall provide the item, product, equipment or material of the highest or more stringent quality.
- 1.13 Shop Drawings; Samples; Product Data (“Submittals”). Shop Drawings are diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Material Supplier, or others to illustrate some portion of the Work. Samples are physical examples of materials, equipment or workmanship forming a part of, or to be incorporated into the Work. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work. Shop Drawings, Samples and Product Data prepared or furnished by the Contractor, Subcontractors or Material Suppliers are collectively referred to as “Submittals”.
- 1.14 Division of State Architect (“DSA”). DSA is the California Division of the State Architect including without limitation DSA’s Office of Construction Services, Office of Design Services and the Office of Regulatory Services; references to the DSA in the Contract Documents shall mean the DSA, its offices and its authorized employees and agents. The authority of the DSA over the Work and the performance thereof shall be as set forth in the Contract Documents and Title 24 of the California Code of Regulations.
- 1.15 District’s Inspector. The District’s Inspector is the individual designated and employed by the District in accordance with the requirements of Title 24 of the California Code of Regulations. The District’s Inspector shall be authorized to act on behalf of the District as provided for in the Contract Documents and in Title 24 of the California Code of Regulations, as the same may be amended from time to time.
- 1.16 Contract Document Terms. The term “provide” means “provide complete in place” or to “furnish and install” such item. Unless otherwise provided in the Contract Documents, the terms “approved;” “directed;” “satisfactory;” “accepted;” “acceptable;” “proper;” “required;” “necessary”

and “equal” shall mean as approved, directed, satisfactory, accepted, acceptable, proper, required, necessary and equal, in the opinion of the Architect. The term “typical” as used in the Drawings shall require the installation or furnishing of such item(s) of the Work designated as “typical” in all other areas similarly marked as “typical”; Work in such other areas shall conform to that shown as “typical” or as reasonably inferable therefrom.

- 1.17 Contractor’s Superintendent. The Contractor’s Superintendent is the individual employed by the Contractor whose principal responsibility shall be the supervision and coordination of the Work; the Contractor’s Superintendent shall not perform routine construction labor.
- 1.18 Record Drawings. The Record Drawings are a set of the Drawings marked by the Contractor during the performance of the Work to indicate completely and accurately the actual as-built condition of the Work. The Record Drawings shall be sufficient for a capable and qualified draftsman to modify the Drawings to reflect and indicate the Work actually in place at Final Completion of the Work.
- 1.19 Project Manager. The Project Manager, if any, is the individual or entity designated as such in the Special Conditions. The Project Manager is an independent contractor retained by the District and shall be authorized and empowered to act on behalf of the District. In the event that a Project Manager is not designated in the Special Conditions, the District reserves the right to designate a Project Manager at any time during Contractor’s performance of the Work. The District reserves the right to remove or replace the Project Manager during Contractor’s performance of the Work. The designation of a Project Manager, if one has not been designated in the Special Conditions, or the removal or replacement of the designated Project Manager shall not result in adjustment of the Contract Price or the Contract Time or otherwise affect, limit or restrict Contractor’s obligations hereunder.
- 1.20 Construction Equipment. Construction Equipment is equipment utilized for the performance of any portion of the Work, but which is not incorporated into the Work.
- 1.21 Site. The Site is the physical area designated in the Contract Documents for Contractor’s performance, construction and installation of the Work.
- 1.22 Field Clarifications. A written or graphic document consisting of supplementary details, instructions or information issued on behalf of the District which clarifies or supplements the Contract Documents and which becomes a part of the Contract Documents upon issuance. Field Clarifications do not constitute an adjustment of the Contract Time or the Contract Price, unless a Change Order relating to a Field Clarification is authorized and issued under the Contract Documents.
- 1.23 Defective or Non-Conforming Work. Defective or Non-Conforming Work is any Work which is unsatisfactory, faulty or deficient by: (i) not conforming to the requirements of the Contract Documents; (ii) not conforming to the standards of workmanship of the applicable trade or industry; (iii) not being in compliance with the requirements of any inspection, reference, standard, test, or approval required by the Contract Documents; or (iv) damage occurring prior to Final Completion of all of the Work.
- 1.24 Delivery. Delivery used in conjunction with any equipment, materials or other items to be incorporated into the Work shall mean the unloading and storage in a protected condition at the Site pending incorporation into the Work.
- 1.25 Notice to Proceed. The Notice to Proceed is the written notice issued by or on behalf of the District to the Contractor authorizing the Contractor to proceed with commencement of the Work and which establishes the date for commencement of the Contract Time.
- 1.26 Progress Reports; Verified Reports. Progress Reports, if required, are written reports prepared by the Contractor and periodically submitted to the District in the form and content as required

by the Contract Documents. Verified Reports are periodic written reports prepared by the Contractor and submitted to the DSA; Verified Reports shall be in such form and content as required by the applicable provisions of Title 24 of the California Code of Regulations. A material obligation of the Contractor is the preparation of complete and accurate Progress Reports, if required, and Verified Reports as well as the timely submission of the same.

- 1.27 Laws. Laws refer to all laws, ordinances, codes, rules and/or regulations promulgated by any governmental or quasi-governmental agency with jurisdiction over any portion of the Work and which apply to any portion of the Work, including those in effect as of the execution of the Agreement, amendments thereto and subsequently enacted Laws that take effect during the performance of the Work. No adjustment of the Contract Time or the Contract Price shall be allowed for the Contractor's compliance with the Laws.
- 1.28 Construction Change Directive. A Construction Change Directive is a written instrument issued by or on behalf of the District to the Contractor directing a Change to the Work prior to the Contractor and District reaching full agreement on an adjustment of the Contract Time and/or Contract Price on account of such Change. A material obligation of the Contractor is timely performance of Work noted in a Construction Change Directive.

ARTICLE 2: DISTRICT

2.1 Information Required of District

2.1.1 Surveys; Site Information. Information, if any, concerning physical characteristics of the Site, including without limitation, surveys, soils reports, and utility locations, to be provided by the District are set forth in the Contract Documents. Information not provided by the District or necessary information in addition to that provided by the District concerning physical characteristics of the Site which is required shall be obtained by Contractor without adjustment to the Contract Price or the Contract Time.

2.1.2 Permits, Licenses, Approvals. Except as otherwise provided in the Contract Documents, the District shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities which relate to the Work of the Contractor under the Contract Documents. If permits, licenses, approvals or similar approvals relating to the Work, or the installation/construction thereof are designated as the responsibility of the Contractor under the Contract Documents, the Contractor shall obtain the same without adjustment of the Contract Price or the Contract Time.

2.1.3 Drawings and Specifications. Except as otherwise provided for in the Contract Documents, the District shall furnish the Contractor, free of charge, the number of copies of the Drawings and the Specifications as set forth in the Special Conditions. All of the Drawings and the Specifications provided by the District to the Contractor remain the property of the District; the Contractor shall not use the Drawings or the Specifications in connection with any other work of improvement other than the Work.

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

between conditions or existing improvements depicted in the Contract Documents and those conditions or existing improvements actually encountered in the performance of the Work. The existence of any variations between conditions or existing improvements depicted in the Contract Documents and those actually encountered in the performance of the Work shall not result in any District liability therefor, nor shall any such variations result in an adjustment of the Contract Time or the Contract Price.

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

2.3 Partial Occupancy or Use.

2.3.1 District's Right to Partial Occupancy. The District may occupy or use any completed or partially completed portion of the Work, provided that: (i) the District has obtained the consent of, or is otherwise authorized by, public authorities with jurisdiction thereof, to so occupy or use such portion of the Work and (ii) the District and the Contractor have accepted, in writing, the responsibilities assigned to each of them for security, maintenance, utilities, damage to the Work, insurance, the period for correction of the Work and commencement of warranties required by the Contract Documents for such portion of the Work partially used or occupied by the District. If the Contractor and the District are unable to agree upon the matters set forth in (ii) above, the District may nevertheless use or occupy any portion of the Work, with the responsibility for such matters subject to resolution in accordance with the Contract Documents. Immediately prior to such partial occupancy or use of the Work, or portions thereof, the District, the District's Inspector, the Contractor and the Architect shall jointly inspect the portions of the Work to be occupied or to be used to determine and record the condition of the Work. Repairs, replacements or other corrective action noted in such inspection shall be promptly performed and completed by the Contractor so that the portion of the Work to be occupied or used by the District is in conformity with the requirements of the Contract Documents and the District's occupancy or use thereof is not impaired. The District's use or occupancy of the Work or portions thereof pursuant to the preceding shall not be deemed "completion" of the Work as that term is used in Public Contract Code §7107.

2.3.2 No Acceptance of Defective or Nonconforming Work. The District's partial occupancy or use of the Work or any portion thereof, shall not constitute the District's acceptance of the Work which is defective or non-conforming.

2.4 District's Inspector.

2.4.1 Authority of District's Inspector. In addition to the authority and rights of the District's Inspector as provided for elsewhere in the Contract Documents and/or the Laws, all of the Work shall be performed under the observation of the District's Inspector. The foregoing notwithstanding, the Contractor shall not perform any Work deviating from the Contract Documents solely on the basis of direction by the District's Inspector; such deviations shall be deemed defective or non-conforming Work subject to correction or replacement at the sole cost of the Contractor and without adjustment of the Contract Time. The performance of the duties of the District's Inspector shall not relieve or limit the Contractor's performance of its obligations under the Contract Documents.

2.4.2 Limitations on District's Inspector. The does not have authority to interpret the Contract Documents or to modify the Work depicted in the Contract Documents. The District's Inspector has no authority relative to the content or scope of the Contractor's safety plan/program. The Contractor shall not perform any Work deviating from the Contract Documents solely on the basis of direction by the District's Inspector; such deviations shall be deemed Defective or Non-Conforming Work subject to correction or replacement at the sole cost of the Contractor and without adjustment of the Contract Time.

2.4.3 Contractor Access for District's Inspector. The Contractor shall provide the District's Inspector with access to all parts of the Work at any time, wherever located and whether partially or completely fabricated, manufactured, furnished or installed.

2.4.4 Contractor and District Responsibilities for Costs and Fees of District's Inspector. The District is responsible only for payment of the fees of the District's Inspector for standard eight (8) hour work day Mondays through Fridays, excepting holiday days ("District's Inspector Standard Workdays"). Unless the District directs the Contractor to perform Work exceeding the District's Inspector Standard Workdays, for any Work performed by the Contractor outside the District's Inspector Standard Workdays, the Contractor shall be responsible for payment of District's Inspector fees for District's Inspector services relating to such Work. All services provided by the District's Inspector exceeding an eight (8) hour workday Mondays through Fridays and/or the first eight (8) hours on Saturdays shall be at one and one-half (1½) times the District's Inspector's basic hourly rate. All hours of service provided by the District's Inspector in excess of eight (8) hours on Saturdays, and all hours of service provided by the District's Inspector on holiday days or on Sundays are at two (2) times the District's Inspector's basic hourly rate. Fees for services provided by the District's Inspector beyond the District's Inspector Standard Workdays set forth above are the sole responsibility of the Contractor; the District may deduct such fees from the Contract Price then or thereafter due the Contractor.

ARTICLE 3: ARCHITECT

3.1 Architect's Administration of the Contract.

3.1.1 Administration of Contract. The Architect will provide administration of the Contract as described in the Contract Documents, and will be one of the District's representatives during construction until the time that Final Payment. The Architect will advise and consult with the District, the Project Manager, if any, and the District's Inspector with respect to the administration of the Contract and the Work. The Architect is authorized to act on behalf of the District to the extent provided for in the Contract Documents; and shall have the responsibilities and authority established by the Laws.

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

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

3.1.4 Review of Applications for Payment. Pursuant to Article 8 hereof, the Architect will

review the Contractor's Payment Applications and for Final Payment, evaluate the extent of Work performed and verify to the District the amount properly due the Contractor on such Application for Payment.

3.1.5 Rejection of Work. The Architect is authorized to reject Work which is defective or does not conform to the requirements of the Contract Documents. Whenever the Architect considers it necessary or advisable, for implementation of the intent of the Contract Documents, the Architect is authorized to require additional inspections or testing of the Work, whether or not such Work is fabricated, installed or completed. Neither this authority of the Architect nor a decision made in good faith by the Architect to exercise or not to exercise such authority shall modify requirements of the Contract Documents or any obligation of the Contractor under the Contract Documents.

3.1.6 Submittals.

3.1.6.1 Architect's Review. The Architect will review and approve or take other appropriate action upon Submittals for the limited purpose of checking for general conformance with information given and the design concept expressed in the Contract Documents. Review of Submittals is not for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor. The Architect's review of the Contractor's Submittals shall not: (i) modify or limit the Contractor's obligations under the Contract Documents; (ii) requirements of the Contract Documents relating to the Work; (iii) approval of safety measures, programs or precautions; or (iv) construction means, methods, techniques, sequences or procedures. The Architect's acceptance of a specific item in a Submittal shall not indicate approval of an assembly of which the item is a component with the Submittal(s) required and relating to such assembly have been reviewed by the Architect.

3.1.6.2 Time for Architect's Review. The Architect's review of Submittals will be conducted promptly so as not to delay or hinder the progress of the Work or the activities of the Contractor, the District or the District's separate contractors while allowing sufficient time, in the Architect's reasonable professional judgment, to permit adequate review of Submittals. The foregoing notwithstanding, the Architect's review and return of Submittals will conform with the time limits and other conditions, if any, set forth in the Specifications or the Submittal Schedule if the Submittal Schedule is required by other provisions of the Contract Documents.

3.1.7 Issuance of Construction Change Directive. The Architect is authorized to issue Construction Change Directives.

3.1.8 Changes to the Work; Change Orders. The Architect will prepare Change Orders, and may authorize minor Changes in the Work which do not result in adjustment of the Contract Time or the Contract Price.

3.1.9 Completion. In conjunction with the District, District's Inspector, Project Manager, if any, and the Contractor, the Architect will conduct observations of the Work to determine the date(s) of Completion and Final Completion. If the District does not designate a Project Manager for the Work, the Architect shall: (i) be authorized to enforce the Contractor's close-out obligations; and (ii) receive from the Contractor and the records, written warranties and related close-out materials assembled by the Contractor in accordance with the Contract Documents.

3.1.10 Interpretation of Contract Documents. The Architect will interpret and decide matters concerning the requirements of the Contract Documents on written request of either the District or the Contractor. The Architect's response to such requests will be made with reasonable promptness and within the time limits agreed upon, if any. If no agreement is reached establishing the time for the Architect's review and response to requests under this Article 3.1.10, the Architect shall be afforded a fifteen (15) day period after receipt of such request to review and respond thereto. Interpretations and decisions of the Architect will: (i) be consistent

with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions; (ii) endeavor to secure faithful performance by both the District and the Contractor; (iii) not show partiality to either the District or Contractor; and (iv) not result in liability for results of interpretations or decisions so rendered in good faith. The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

3.1.11 Request for Information. If the Contractor encounters any condition which the Contractor believes, in good faith and with reasonable basis, is the result of an ambiguity, conflict, error or omission in the Contract Documents (collectively "the Conditions"), Contractor shall timely notify the Architect, in writing, of the Conditions encountered and to request information from the Architect 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 Architect in writing of any Conditions encountered and the Contractor proceeds to perform any portion of the Work containing or affected by such Conditions the Contractor shall bear all costs associated with or required to correct, remove, or otherwise remedy any portion of the Work affected thereby without adjustment of the Contract Time or the Contract Price. In requesting information of the Architect to address and resolve any Conditions the Contractor shall act with promptness in submitting any such written request so as to allow the Architect a reasonable period of time to review, evaluate and respond to any such request, taking into account the then current status of the progress and completion of the Work and the actual or potential impact of any such Conditions upon the completion of the Work within the Contract Time. The Contract Time shall not be subject to adjustment in the event that the Contractor shall fail to timely request information from the Architect. The Architect's responses to any such Contractor request for information shall conform to the standards and time frame set forth in Article 3.1.10 of these General Conditions. The foregoing provisions notwithstanding, if 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; (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. In responding to any of Contractor's request(s) for information, the Architect shall, in the response, indicate if the Architect has made the determination pursuant to the preceding sentence and, if so, the costs to be borne by the Contractor for the processing, review, evaluation and response to the request for information. Thereafter, the District is authorized to deduct such costs from any portion of the Contract Price then or thereafter due the Contractor.

3.2 Communications; Architect's Role. All communications regarding the Work, the performance thereof or the Contract Documents shall be in writing; verbal communications shall be reduced to writing. If the District does not designate a Project Manager for the Work, communications between the Contractor and the District shall be through the Architect. Communications between separate contractors, if any, shall be through the Architect.

3.3 Termination of Architect; Substitute Architect. In case of termination of employment of the Architect, the District shall appoint a substitute architect whose status under the Contract Documents shall be that of the Architect.

3.4 Project Manager. If a Project Manager is designated for the Work, the Project Manager shall be a representative of the District until Final Completion is achieved and Final Payment is due the Contractor. The Project Manager is authorized to act on behalf of the District and in connection with the Work as set forth in the Contract Documents, including without limitation: (i) review of the Contractor's Construction Schedule and updates thereto; (ii) review of the Contractor's Applications for

Payment and verification of the amount due the Contractor under an Application for Payment; (iii) conducting the Pre-Construction Meeting, Progress Meetings and/or Special Meetings and maintaining minutes thereof; and (iv) enforcement of the Contractor's obligations under the Contract Documents, including the Contractor's close-out obligations.

ARTICLE 4: THE CONTRACTOR

4.1 Contractor Review of Contract Documents.

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

4.1.2 Field Measurements. Prior to commencement of the Work, or portions thereof, the Contractor shall take field measurements and verify field conditions at the Site and shall carefully compare such field measurements and conditions with information provided in the Contract Documents. Errors, inconsistencies or omissions discovered shall be immediately reported to the Architect along with request for clarification or direction.

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

4.1.4 Work in Accordance With Contract Documents. The Contractor shall perform all of the Work in strict conformity with the Contract Documents, the Laws and Architect accepted Submittals.

4.2 Site Investigation; Subsurface Conditions.

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

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

analysis of information furnished by the District under the Contract Documents. Subsurface data or other soils investigation report provided by the District hereunder are not a part of the Contract Documents. Information contained in such data or report regarding subsurface conditions, elevations of existing grades or below grade elevations are approximate only and are neither guaranteed or warranted by the District to be complete and accurate. The Contractor shall examine all boring and other subsurface data to make its own independent interpretation of the subsurface conditions and acknowledges that its bid is based upon its own opinion of the conditions which may be encountered. The District assumes no responsibility for any conclusions or interpretations made by Contractor on the basis of available subsurface data or other information furnished by District under the Contract Documents.

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

4.3 Supervision and Construction Procedures.

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

4.3.2 Responsibility for the Work. The Contractor is responsible to the District for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and all other persons performing any portion of the Work under a contract with the Contractor. The Contractor is not relieved from its obligation to perform the Work in accordance with the Contract Documents either by activities or duties of the Project Manager, District's Inspector or the Architect, or by tests, inspections or approvals required or performed by persons other than the Contractor.

4.3.3 Surveys. The Contractor shall prepare or cause to be prepared all detailed surveys necessary for performance of the Work, including without limitation, slope stakes, points, lines and elevations. The Contractor is responsible for the establishment, location, maintenance and preservation of benchmarks, reference points and stakes for the Work without adjustment of the Contract Price. The Contractor is solely responsible for all loss or costs resulting from the loss, destruction, disturbance or damage of benchmarks, reference points or stakes.

4.3.4 Construction Utilities. The District will furnish and pay the costs of utility services for the Work as set forth in the Special Conditions; all other utilities necessary to complete the Work and the Contractor's obligations hereunder shall be obtained by the Contractor without adjustment of the Contract Price or the Contract Time. The Contractor shall furnish and install necessary or appropriate temporary distributions of utilities, including utilities furnished by the District. Any such temporary distributions shall be removed by the Contractor upon completion of the Work. The costs of all such utility services, including the installation, relocations and removal of temporary distributions thereof, shall be borne by the Contractor and included in the Contract Price.

4.3.5 Existing Utilities: Removal, Relocation and Protection. In accordance with California Government Code §4215, the District assumes responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the Site which are not identified in the Drawings, Specifications or other Contract Documents. Contractor shall be compensated for the costs of locating, repairing damage not due to the Contractor's failure to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Drawings, Specifications and other Contract Documents with reasonable accuracy and for equipment on the Site necessarily idled during such work. Contractor shall not be assessed Liquidated Damages for delay in completion of the Work when such delay is caused by the failure of the District or the owner of the utility to provide for removal or relocation of such utility facilities. The foregoing notwithstanding, the District is not required to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities can be inferred from the presence of other visible facilities, such as buildings, meters and junction boxes, on or adjacent to the Site. If the Contractor encounters utility facilities not identified by the District in the Drawings, Specifications, or other Contract Documents, the Contractor shall immediately notify, in writing, the District, the District's inspector, the Architect, the Project Manager and the utility owner. If utility facilities are owned by a public utility, the public utility shall have the sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a reasonable price.

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

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

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

the Project participants, and reviews of the Construction Schedule and Submittals.

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

4.3.6.4 Minutes of Meetings. Following conclusion of the Pre-Construction Conference, Progress Meetings and Special Meetings, the Architect or the Project Manager will prepare and distribute minutes reflecting the items addressed and actions taken at a meeting or conference. Unless the Contractor notifies the Architect or the Project Manager in writing of objections or corrections to minutes prepared hereunder within five (5) days of the date of distribution of the minutes, the minutes as distributed shall constitute the official record of the meeting or conference. No objections or corrections of any Subcontractor or Material Supplier shall be submitted directly to the Architect or the Project Manager; such objections or corrections shall be submitted to the Architect and the Project Manager through the Contractor. If the Contractor timely interposes objections or notes corrections, the resolution of such matters shall be addressed at the next scheduled Progress Meeting.

4.4 Labor and Materials.

4.4.1 Payment for Labor, Materials and Services. Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, Construction Equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated in the Work.

4.4.2 Employee Discipline. The Contractor shall enforce strict discipline and good order among the Contractor's employees, the employees of any Subcontractor or Sub-subcontractor, and all other persons performing any part of the Work at the Site. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. The Contractor shall dismiss from its employ and direct any Subcontractor or Sub-subcontractor to dismiss from their employment any person deemed by the District to be unfit or incompetent to perform Work and thereafter, the Contractor shall not employ nor permit the employment of such person for performance of any part of the Work without the prior written consent of the District, which consent may be withheld in the reasonable discretion of the District.

4.4.3 Compliance with Immigration Reform and Control Act of 1986. The Contractor is solely and exclusively responsible for employment of individuals for the Work of the Contract in conformity with the Immigration Reform and Control Act of 1986, 8 USC §§1101 et seq. (the "IRCA"); the Contractor shall also require Subcontractors and any other person or entity employing labor in connection with any of the Work to so similarly comply with the IRCA. The foregoing includes without limitation, verification that individuals engaged in any Work are legally entitled to do so.

4.4.4 Contractor's Supervisory Personnel. Prior to start of Work at the Site, the Contractor shall submit to the District, Architect and Project Manager, a written statement of the qualifications of the Contractor's proposed Superintendent and Project Manager for the Work. Acceptance of the Contractor's proposed Superintendent and Project Manager is subject to establishing their: (i) skills, experience and other capabilities to supervise, coordinate and manage the Work; (ii) fluent verbal and written English language capabilities; (iii) competency in reading, comprehending and understanding drawings, specifications and other technical construction-related materials; and (iv) recent experience of in completing construction projects similar to the Work within the budget and time established for such other construction projects. Upon acceptance of the Contractor's Superintendent or Project Manager by the District, the Contractor shall not be change such personnel without prior consent of the District, unless such personnel: (i) are unsatisfactory to the Contractor and ceases to be employed by the Contractor for the Work; or (ii) is determined by the District to be unfit, incompetent or incapable of

performing functions and responsibilities assigned.

4.4.5 Prohibition on Harassment.

4.4.5.1 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, veteran status or other legally protected classification. Harassment includes without limitation, verbal, physical or visual conduct which creates an intimidating, offensive or hostile environment such as racial slurs; ethnic jokes; posting of offensive statements, posters or cartoons or similar conduct. Sexual harassment includes without limitation the solicitation of sexual favors, unwelcome sexual advances, or other verbal, visual or physical conduct of a sexual nature.

4.4.5.2 Contractor's Adoption of Anti-Harassment Policy. Contractor shall adopt and implement all appropriate and necessary policies prohibiting any form of discrimination in the workplace, including without limitation harassment on the basis of any classification protected under local, state or federal law, regulation or policy. Contractor shall take all reasonable steps to prevent harassment from occurring, including without limitation affirmatively raising the subject of harassment among its employees, expressing strong disapproval of any form of harassment, developing appropriate sanctions, informing employees of their right to raise and how to raise the issue of harassment and informing complainants of the outcome of an investigation into a harassment claim. Contractor shall require that any Subcontractor or Sub-subcontractor performing any portion of the Work to adopt and implement policies in conformity with this Article 4.4.4.

4.4.5.3 Prohibition on Harassment at the Site. Contractor shall not permit any person, whether employed by Contractor, a Subcontractor, or any other person or entity, performing any Work at or about the Site to engage in any prohibited form of harassment. Any such person engaging in a prohibited form of harassment directed to any individual performing or providing any portion of the Work at or about the Site shall be subject to appropriate sanctions in accordance with the anti-harassment policy adopted and implemented pursuant to Article 4.4.4.2 above. Any person, performing or providing Work on or about the Site engaging 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. If 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, District shall have no liability for directing the removal of any person determined to have engaged in a prohibited form of harassment nor shall the Contract Price or the Contract Time be adjusted on account thereof. Contractor and the Surety shall defend, indemnify and hold harmless the District and its employees, officers, board of trustees, agents, and representatives from any and all claims, liabilities, judgments, awards, actions or causes of actions, including without limitation, attorneys' fees, which arise out of, or pertain in any manner to: (i) the assertion by any person dismissed from performing or providing work at the direction of the District pursuant to this Article 4.4.4.3; or (ii) the assertion by any person that any person directly or indirectly under the employment or direction of the Contractor has engaged in a prohibited form of harassment directed to or affecting such person. The obligations of the Contractor and

the Surety under the preceding sentence are in addition to, and not in lieu of, any other obligation of defense, indemnity and hold harmless whether arising under the Contract Documents, at law or otherwise; these obligations survive completion of the Work or the termination of the Contract.

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

4.6 Permits, Fees and Notices; Compliance With Laws.

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

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

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

4.7 Submittals.

4.7.1 Purpose of Submittals. Submittals are not Contract Documents. Submittals are for the purpose of demonstrating, for those portions of the Work for which Submittals are required, the manner in which the Contractor proposes to provide or incorporate such item of the Work in conformity with the information given and the design concept expressed in the Contract Documents.

4.7.2 Contractor's Submittals.

4.7.2.1 Prompt Submittals. The Contractor shall review, approve and submit to the Architect or such other person or entity designated by the District or the Contract Documents, the number of copies of Submittals required by the Contract Documents. All Submittals required by the Contract Documents shall be prepared, assembled and submitted by the Contractor within the time frames set forth in the Submittal Schedule incorporated and made a part of the Approved Construction Schedule. Contractor's submission of Submittals in conformity with the Submittal Schedule is a material obligation of the Contractor. If the Contractor fails or refuses to deliver Submittals in accordance with the Submittal Schedule, the Contractor shall be subject to per diem assessments in the amount set forth in the Special Conditions for each day of delayed submission for any Submittal beyond the date set forth in the Submittal Schedule for Contractor's submission of such Submittal. Contractor and the District acknowledge and agree that the per diem assessment for delayed submission of Submittals set forth in the Special Conditions represents a reasonable estimate of costs and expenses the District will incur as a result of delayed submission of Submittals and that the same is not a penalty. Notwithstanding Contractor's submission of all required Submittals in accordance with the Submittal Schedule, in the event that the District or the Architect reasonably determines that all or any portion of such Submittals fail to comply with the requirements of Articles 4.7.2.2, 4.7.2.3 and 4.7.2.4 of these General Conditions and/or

such Submittals are not otherwise complete and accurate so as to require re-submission, Contractor shall bear all costs associated with the review and approval of resubmitted Submittals, including without limitation Architect's fees incurred in connection therewith; provided that such costs are in addition to, and not in lieu of, Liquidated Damages imposed under this Article 4.7.2.1 for Contractor's delayed submission of Submittals. If Liquidated Damages are assessed for the Contractor's delayed submission of Submittals or if the Contractor is assessed Architect fees to review incomplete or inaccurate Submittals, the District may deduct the same from any portion the Contract Price then or thereafter due the Contractor. Submittals not required by the Contract Documents or which do not otherwise conform to the requirements of the Contract Documents may be returned without action. No adjustment to the Contract Time or the Contract Price shall be granted to the Contractor on account of its failure to timely submit of any Submittal.

4.7.2.2 Approval of Subcontractor Submittals. All Submittals prepared by Subcontractors, Material Suppliers, manufacturers or distributors shall bear the written approval of the Contractor thereto prior to submission to the Architect for review. Any Submittal not bearing the Contractor's written approval shall be subject to return to the Contractor for re-submittal in conformity herewith, with the same being deemed to not have been submitted. Any delay, impact or cost associated therewith shall be the sole and exclusive responsibility of the Contractor without adjustment to the Contract Time or the Contract Price.

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

4.7.2.4 Information Included in Submittals. All Submittals shall be accompanied by a written transmittal or other writing by the Contractor providing an identification of the portion of the Drawings or the Specifications pertaining to the Submittal, with each Submittal numbered consecutively for ease of reference along with the following information: (i) date of submission; (ii) project name; (iii) name of submitting Subcontractor; and (iv) if applicable, the revision number. The foregoing information is in addition to, and not in lieu of, any other information required by the Contract Documents for the Architect's review, evaluation and acceptance of the Contractor's Submittals.

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

4.7.2.6 No Performance of Work Without Architect Review. The Contractor shall perform no portion of the Work requiring the Architect's review of Submittals until the Architect has completed its review and returned the Submittal to the Contractor indicating "No Exception Taken" to such Submittal. The Contractor shall not perform any portion of the Work forming a part of a Submittal or which is affected by a related Submittal until the entirety of the Submittal or other related Submittal has been fully processed. Such Work shall be in accordance with the final action taken by the Architect in review of Submittals and other applicable portions of the Contract Documents.

4.7.3 Architect Review of Submittals. The purpose of the Architect's review of Submittals and the time for the Architect's return of Submittals to the Contractor shall be as set forth elsewhere

Notation	Action Required
No Exceptions Taken	No formal revision required
Make Corrections Noted	Make revision noted; re-submission of revised Submittal not required
Revise and Re-Submit	Revise Submittal in accordance with notations and re-submit for revision
Rejected Re-Submit	Prepare new alternative Submittal and re-submit for review

in the Contract Documents. If the Architect returns a Submittal as rejected or requiring correction(s) with re-submission, the Contractor, so as not to delay the progress of the Work, shall promptly thereafter resubmit a Submittal conforming to the requirements of the Contract Documents; the resubmitted Submittal shall indicate the portions thereof modified in accordance with the Architect’s direction. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications accompanying Submittals. The Architect’s review of the Submittals is for the limited purposes described in the Contract Documents. The following notations or notations of a similar nature noted on a reviewed Submittal will require the Contractor action noted below.

4.7.4 Deferred Approval Items. If any portion of the Work is designated in the Contract Documents as a “Deferred Approval” item, Contractor shall be solely and exclusively responsible for: (i) the design, engineering and specifying the materials/equipment forming any part of the Deferred Approval Item; (ii) integrating and/or coordinating the Deferred Approval Item with other portions of the Work; (iii) preparation of Submittals for such item(s) in a timely manner so as not to delay or hinder the completion of the Work within the Contract Time; and (iv) timely obtaining DSA approval thereof.

4.8 Materials and Equipment.

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

4.8.2 Approval of Substitutions or Alternatives. The Contractor may propose to furnish alternatives or substitutes for a particular item specified in the Contract Documents, provided that: (i) such proposed substitution or alternative complies with the requirements of the Specifications relating to substitutions of specified items; (ii) the Contractor certifies to the Architect and District that the quality, performance capability and functionality (including visual and/or aesthetic effect) of the proposed alternative or substitute meet or exceed the quality, performance capability and functionality of the item or process specified; and (iii) demonstrate to the reasonable satisfaction of the Architect and District that the use of the substitution or alternative is appropriate and will not delay completion of the Work or result in an increase to the Contract Price. The Contractor shall submit calculations engineering, construction, dimension, visual, aesthetic and performance data to the Architect to permit its proper evaluation of the proposed substitution or alternative. If requested by the Architect, Contractor shall promptly furnish any additional information or data regarding a proposed substitution or alternative which the Architect deems reasonably necessary for the evaluation of the proposed substitution or alternative. The Contractor shall not provide, furnish or install any substitution or alternative without the Architect’s review and final action on the proposed substitution or alternative; any alternative or substitution installed or incorporated into the Work without first

obtaining the Architect's review and final action of the same shall be subject to removal pursuant to Article 12 hereof. The Architect's decision evaluating the Contractor's proposed substitutions or alternatives shall be final. Neither the Contract Time nor the Contract Price shall be increased on account of any substitution or alternative proposed by the Contractor and which is accepted by the Architect; provided, however, that in the event a substitution or alternative accepted by the Architect and purchase, fabrication and/or installation or such accepted substitution or alternative shall be less expensive than the originally specified item, the Contract Price shall be reduced by the actual cost savings realized by the Contractor's furnishing and/or installation of such approved substitution or alternative. The Contractor shall be solely responsible for all costs and fees incurred by the District to review a proposed substitution or alternative, including without limitation fees of the Architect, and/or governmental agencies to review and/or approve any proposed substitution or alternative. The Contractor shall be solely responsible for any increase in the cost of any accepted substitution or alternative or any Work affected by such alternative or substitution. The foregoing notwithstanding, all requests for the Architect's review and approval of any proposed substitution or alternative and all engineering, construction, dimension and performance data substantiating the equivalency of the proposed substitution or alternative shall be submitted by Contractor not later than thirty-five (35) days following the date of the District's award of the Contract to Contractor by action of the District's Board of Trustees; any request for approval of proposed alternatives or substitutions submitted thereafter may be rejected summarily. The foregoing process and time limits shall apply to any proposed substitution or alternative regardless of whether the substitute or alternate item is to be provided, furnished or installed by Contractor, any Subcontractor, any Sub-Subcontractor, Material Supplier or Manufacturer.

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

4.8.4 District's Right to Place Orders for Materials and/or Equipment. Notwithstanding any other provision of the Contract Documents, if the Contractor shall, upon request of the District, Project Manager or the Architect, fails or refuses, for any reason, to provide reasonably satisfactory written evidence of the placement of orders for materials and/or equipment necessary for completion of the Work, or should the District determine, in its sole and reasonable discretion, that any orders for materials and/or equipment have not been placed in a manner so that such materials and/or equipment will be delivered to the Site so the Work can be completed without delay or interruption, the District shall have the right, but not the obligation, to place such orders on behalf of the Contractor. If the District exercises the right to place orders for materials and/or equipment pursuant to the foregoing, the District's conduct shall not be deemed to be an exercise, by the District, of any control over the means, methods, techniques, sequences or procedures for completion of the Work, all of which remain the responsibility and obligation of the Contractor. Notwithstanding the right of the District to place orders for materials and/or equipment pursuant to the foregoing, the election of the District to exercise, or not to exercise, such right shall not relieve the Contractor from any of Contractor's obligations under the Contract Documents, including without limitation, completion of the Work within the Contract Time and for the Contract Price. If the District exercises the right hereunder to place orders for materials and/or equipment on behalf of Contractor pursuant to the foregoing, Contractor shall reimburse

the District for all costs and fees incurred by the District in placing such orders; such costs and fees may be deducted by the District from the Contract Price then or thereafter due the Contractor.

4.8.5 Contractor and Subcontractor Communication. All written communications between the Contractor and any Subcontractor, Material Supplier or others directly or indirectly engaged by the Contractor to perform or provide any portion of the Work shall be available to the District, the Project Manager and the Architect for review, inspection and reproduction as may be requested from time to time. The foregoing is a material obligation of the Contractor hereunder.

4.9 Safety.

4.9.1 Safety Programs. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety programs required by applicable law, ordinance, regulation or governmental orders in connection with the performance of the Contract, or otherwise required by the type or nature of the Work. The Contractor's safety program shall include all actions and programs necessary for compliance with California or federally statutorily mandated workplace safety programs, including without limitation, compliance with the California Drug Free Workplace Act of 1990 (California Government Code §§8350 et seq.). Without limiting or relieving the Contractor of its obligations hereunder, the Contractor shall require that its Subcontractors similarly initiate and maintain all appropriate or required safety programs.

4.9.2 Contractor Safety Plan. Prior to commencement of Work at the Site, the Contractor shall submit to the District and the Project Manager, if any, the Contractor's Safety Plan for the Work for review and acceptance by the District. Acceptance by the District is subject to the Safety Plan conforming to requirements of the Laws, conditions at or about the Site and the nature of the Work. The Contractor shall modify its Safety Plan as necessary to obtain the District's acceptance thereof. Notwithstanding the District's acceptance of the Contractor's Safety Plan, the Contractor shall remain solely responsible for implementing the Safety Plan and implementing measures as necessary to maintain safety of persons and property at and about the Site. The District's acceptance of the Contractor's Safety Plan shall not limit, restrict or otherwise modify the Contractor's obligations relating to safety at or about the Site in accordance with the Contract Documents and the Laws.

4.9.3 Safety Precautions. The Contractor shall be solely responsible for initiating and maintaining reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to: (i) employees on the Work and other persons who may be affected thereby; (ii) the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site, under care, custody or control of the Contractor or Subcontractors; and (iii) other property or items at the Site, or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement.

4.9.4 Safety Signs, Barricades. The Contractor shall erect and maintain, as required by existing conditions and conditions resulting from performance of the Contract, reasonable safeguards for safety and protection of property and persons, including, without limitation, posting danger signs and other warnings against hazards, barricades, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

4.9.5 Safety Notices. The Contractor shall give or post all safety notices required by the Laws and comply with the Laws bearing on safety of persons or property or their protection from damage, injury or loss.

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

4.9.7 Emergencies. In an emergency affecting safety of persons or property, the Contractor

shall act, to prevent threatened damage, injury or loss.

4.9.8 Hazardous Materials.

4.9.8.1 General. If the Contractor, any Subcontractor or anyone employed directly or indirectly by them shall use, at the Site, or incorporate into the Work, any material or substance deemed to be hazardous or toxic under any law, rule, ordinance, regulation or interpretation thereof (collectively "Hazardous Materials"), the Contractor shall comply with all Laws applicable thereto and shall exercise all necessary safety precautions relating to the use, storage or disposal thereof.

4.9.8.2 Prohibition on Use of Asbestos Construction Building Materials ("ACBMs"). Notwithstanding any provision of the Drawings or the Specifications to the contrary, it is the intent of the District that ACBMs not be used or incorporated into any portion of the Work. In the event that any portion of the Work depicted in the Drawings or the Specifications shall require materials or products which the Contractor knows, or should have known with reasonably diligent investigation, to contain ACBMs, Contractor shall promptly notify the Architect and the District's Inspector of the same so that an appropriate alternative can be made in a timely manner so as not to delay the progress of the Work. Contractor warrants to the District that there are no materials or products used or incorporated into the Work which contain ACBMs. Whether before or after completion of the Work, if it is discovered that any product or material forming a part of the Work or incorporated into the Work contains ACBMs, the Contractor shall at its sole cost and expense remove such product or material in accordance with any laws, rules, procedures and regulations applicable to the handling, removal and disposal of ACBMs and to replace such product or material with non-ACBM products or materials and to return the affected portion(s) of the Work to the finish condition depicted in the Drawings and Specifications relating to such portion(s) of the Work. Contractor's obligations under the preceding sentence shall survive the termination of the Contract, the warranty period provided under the Contract Documents, the Contractor's completion of the Work or the District's acceptance of the Work. If the Contractor fails or refuses, for any reason, to commence the removal and replacement of any material or product containing ACBMs forming a part of, or incorporated into the Work, within ten (10) days of the date of the District's written notice to the Contractor of the existence of ACBM materials or products in the Work, the District may thereafter proceed to cause the removal and replacement of such materials or products in any manner which the District determines to be reasonably necessary and appropriate; all costs, expenses and fees, including without limitation fees and costs of consultants and attorneys, incurred by the District in connection with such removal and replacement shall be the responsibility of the Contractor and the Surety.

4.9.8.3 Disposal of Hazardous Materials. Contractor shall be solely and exclusively responsible for the disposal of any Hazardous Materials on or about the Site. The Contractor's obligations hereunder shall include without limitation, the transportation and disposal of any Hazardous Materials in strict conformity with the Laws.

4.10 Maintenance of Documents.

4.10.1.1 Documents at Site. The Contractor shall maintain at the Site: (i) one record copy of the Drawings, Specifications and all addenda thereto; (ii) Change Orders approved by the District and all other modifications to the Contract Documents; (iii) Submittals reviewed by the Architect; (iv) Record Drawings; (v) Material Safety Data Sheets ("MSDS") accompanying any materials, equipment or products delivered or stored at the Site or incorporated into the Work; and (vi) all building and other codes or regulations applicable to the Work, including without limitation, Title 24, Part 2 of the California Code of Regulations. During performance of the Work, all documents maintained by Contractor at the Site shall be available to the District, the Project

Manager, the Architect, the District's Inspector and DSA for review, inspection or reproduction. Upon completion of the Work, all documents maintained at the Site by the Contractor pursuant to the foregoing shall be assembled and transmitted to the Architect for delivery to the District.

4.10.1.2 Maintenance of Record Drawings. During its performance of the Work, the Contractor shall maintain Record Drawings consisting of a set of the Drawings which are marked to indicate all field changes made to adapt the Work depicted in the Drawings to field conditions, changes resulting from Change Orders and all concealed or buried installations, including without limitation, piping, conduit and utility services. All buried or concealed items of Work shall be completely and accurately marked and located on the Record Drawings. The Record Drawings shall be clean and all changes, corrections and dimensions shall be marked in a neat and legible manner in a contrasting color. Record Drawings relating to the Structural, Mechanical, Electrical and Plumbing portions of the Work shall indicate without limitation, circuiting, wiring sizes, equipment/member sizing and shall depict the entirety of the as built conditions of such portions of the Work. The Record Drawings shall be continuously maintained by the Contractor during the performance of the Work. At any time during the Contractor's performance of the Work, upon the request of the District, the District's Inspector or the Architect, the Contractor shall make the Record Drawings maintained here under available for the District's review and inspection. The District's review and inspection of the Record Drawings during the Contractor's performance of the Work shall be only for the purpose of generally verifying that Contractor is continuously maintaining the Record Drawings in a complete and accurate manner; any such inspection or review shall not be deemed to be the District's approval or verification of the completeness or accuracy thereof. The failure or refusal of the Contractor to continuously maintain complete and accurate Record Drawings or to make available the Record Drawings for inspection and review by the District may be deemed by the District to be Contractor's default of a material obligation hereunder. Without waiving, restricting or limiting any other right or remedy of the District for the Contractor's failure or refusal to continuously maintain the Record Drawings, the District may, upon reasonably determining that the Contractor has not, or is not, continuously maintaining the Record Drawings in a complete and accurate manner, take appropriate action to cause the continuous maintenance of complete and accurate Record Drawings, in which event all fees and costs incurred or associated with such action shall be charged to the Contractor and the District may deduct the amount of such fees and costs from any portion of the Contract Price then or thereafter due the Contractor. In accordance with Article 8.4.2 of these General Conditions, prior to receipt of the Final Payment, Contractor shall deliver the Record Drawings to the Architect.

4.11 Use of Site. The Contractor shall confine operations at the Site to areas permitted by the Laws, subject to any restrictions or limitations set forth in the Contract Documents. The Contractor shall not unreasonably encumber the Site or adjoining areas with materials or equipment. The Contractor shall be solely responsible for providing security at the Site with all such costs included in the Contract Price. The District shall at all times have access to the Site.

4.12 Clean-Up. The Contractor shall at all times keep the Site and all adjoining areas free from the accumulation of any waste material or rubbish caused or generated by performance of the Work. Without limiting the generality of the foregoing, Contractor shall maintain the Site in a "rake-clean" standard on a daily basis. If the Work includes painting and/or the installation of floor covering, before any painting operations or the installation of any flooring covering, the area and adjoining areas of the Site where paint is to be applied or floor covering is to be installed shall be in a "broom-clean" condition. Prior to completion of the Work, Contractor shall remove from the Site all rubbish, waste materials, excess excavated materials, tools, Construction Equipment, machinery, surplus materials and any other items which are not the property of the District under the Contract

Documents. Upon completion of the Work, the Site and all adjoining areas shall be left by the Contractor in a neat and broom clean condition satisfactory to District. The District's Inspector or Project Manager shall be authorized to direct the Contractor's clean-up obligations hereunder. If the Contractor fails to clean up as provided for in the Contract Documents, the District may do so, and all costs incurred in connection therewith shall be charged to the Contractor; the District may deduct such costs from any portion of the Contract Price then or thereafter due the Contractor.

4.13 Access to the Work. The Contractor shall provide DSA, the District, the Project Manager, the District's Inspector and the Architect access to the Work, whether in place, preparation and progress and wherever located.

4.14 Facilities and Information for the District's Inspector.

4.14.1 Information to District's Inspector. The Contractor shall furnish the District's Inspector access to the Work for obtaining such information as may be necessary to keep the District's Inspector fully informed respecting the progress, quality and character of the Work and materials, equipment or other items incorporated therein.

4.14.2 Facilities for District's Inspector. Facilities, services or other items to be provided by the Contractor for use by the District's Inspector, if any, shall be as set forth in the Temporary Facilities and Controls Specification Section. If the Contractor fails or refuses to provide and such facilities, services or other items designated the District may furnish such facilities, services or other item, with the costs, fees or expenses incurred to furnish the same being deducted from the Contract Price.

4.15 Patents and Royalties. The Contractor and the Surety shall defend, indemnify and hold harmless the District and its agents, employees and officers from any claim, demand or legal proceeding arising out of or pertaining, in any manner, to any actual or claimed infringement of patent rights in connection with performance of the Work.

4.16 Cutting and Patching. The Contractor is responsible for cutting, fitting or patching required to complete the Work or to make the component parts thereof fit together properly. The Contractor shall not damage or endanger any portion of the Work, or the fully or partially completed construction of the District or separate contractors by cutting, patching, excavation or other alteration. The Contractor shall not cut, patch or otherwise alter the construction by the District or separate contractor without the prior written consent of the District or separate contractor thereto, which consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold consent to the request of the District or separate contractor to cut, patch or otherwise alter the Work.

4.17 Encountering of Hazardous Materials. If the Contractor encounters Hazardous Materials at the Site which have not been rendered harmless or for which there is no provision in the Contract Documents for containment, removal, abatement or handling of such Hazardous Materials, the Contractor shall immediately stop the Work in the affected area, but shall diligently proceed with the Work in all other unaffected areas. Upon encountering such Hazardous Materials, the Contractor shall immediately notify the District's Inspector and the Architect, in writing, of such condition. The Contractor shall proceed with the Work in such affected area only after such Hazardous Materials have been rendered harmless, contained, removed or abated. If such Hazardous Materials are encountered, the Contractor shall be entitled to an adjustment of the Contract Time to the extent that the Work is stopped and Completion of the Work is affected thereby. In no event shall there be an adjustment to the Contract Price solely on account of the Contractor encountering such Hazardous Materials.

4.18 Wage Rates; Employment of Labor.

4.18.1 Determination of Prevailing Rates. Pursuant to the provisions of Division 2, Part 7, Chapter 1, Article 2 of the California Labor Code at §§1770 et seq., the District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the prevailing rate for holiday and overtime work in the locality in which the Work is to be performed. Holidays shall be as defined in the collective bargaining agreement applicable

to each particular craft, classification or type of worker employed under the Contract. Per diem wages include employer payments for health and welfare, pensions, vacation, travel time and subsistence pay as provided in California Labor Code §1773.8, apprenticeship or other training programs authorized by California Labor Code §3093, and similar purposes when the term “per diem wages” is used herein. Holiday and overtime work, when permitted by law, shall be paid for at the rate of at least one and one-half (1½) times the above specified rate of per diem wages, unless otherwise specified. The Contractor shall post, at appropriate and conspicuous locations on the Site, a schedule showing all determined general prevailing wage rates.

4.18.2 Payment of Prevailing Rates. There shall be paid each worker of the engaged in the Work, not less than the general prevailing wage rate for the classification of Work performed, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such worker.

4.18.3 Prevailing Rate Penalty. The Contractor shall, as a penalty, forfeit not more than Two Hundred Dollars (\$200.00) to the District for each calendar day or portion thereof, for each worker paid less than the prevailing rates for such work or craft in which such worker is employed for the Work by the Contractor or by any Subcontractor, of any tier, in connection with the Work. The amount of the penalty for failure to pay applicable prevailing wage rates shall be determined and assessed in accordance with the standards established pursuant to Labor Code §1775(a)(2). The amount of the penalty shall be determined based on consideration of both of the following: (i) whether the failure of the Contractor or Subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected when brought to the attention of the Contractor or Subcontractor; and (ii) whether the Contractor or Subcontractor has a prior record of failing to meet its prevailing wage obligations. The penalty may not be less than forty dollars (\$40) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, unless the failure of the Contractor or Subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected when brought to the attention of the contractor or subcontractor. The penalty may not be less than eighty dollars (\$80) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the Contractor or Subcontractor has been assessed penalties within the previous three years for failing to meet its prevailing wage obligations on a separate contract, unless those penalties were subsequently withdrawn or overturned. The penalty may not be less than one hundred twenty dollars (\$120) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the Labor Commissioner determines that the violation was willful, as defined in subdivision (c) of Section 1777.1. When the penalty amount due hereunder is collected from the Contractor or Subcontractor, any outstanding wage claim under Chapter 1 (commencing with Section 1720) of Part 7 of Division 2 against that Contractor or Subcontractor shall be satisfied before applying that amount to the penalty imposed on that Contractor or Subcontractor hereunder. The difference between prevailing wage rates and the amount paid to each worker each calendar day, or portion thereof, for which each worker paid less than the prevailing wage rate, shall be paid to each worker by the Contractor.

4.18.4 Certified Payroll Records.

4.18.4.1 Maintenance of Certified Payroll Records. Pursuant to California Labor Code §1776, the Contractor and each Subcontractor, of any tier, shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each person employed for the Work.

4.18.4.2 Submittal of Certified Payroll Records to Labor Commissioner. The Contractor and each Subcontractor shall submit their respective Certified Payroll Records to the Labor Commissioner on forms, in the manner and within the times prescribed by the Labor Commissioner.

4.18.4.3 Inspection of Certified Payroll Records. The Certified Payroll Records of

the Contractor and Subcontractors shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis: (i) a certified copy of an employee's payroll record shall be made available for inspection or furnished to such employee or his/her authorized representative on request; (ii) a certified copy of all payroll records shall be made available for inspection or furnished upon request to the District, the Division of Labor Standards Enforcement and the Division of Apprenticeship Standards of the Department of Industrial Relations; (iii) a certified copy of payroll records shall be made available upon request to the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the District, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested Certified Payroll Records have not been provided, the requesting party shall, prior to being provided the records, reimburse the cost of preparation by the Contractor, Subcontractors and the entity through which the request was made; the public shall not be given access to such records at the principal office of the Contractor; (iv) the Contractor shall file a certified copy of the Certified Payroll Records with the entity that requested such records within ten (10) days after receipt of a written request; (v) any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the District, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address and social security number. The name and address of the Contractor or any Subcontractor, of any tier, performing a part of the Work shall not be marked or obliterated. The Contractor shall inform the District of the location of Certified Payroll Records, including the street address, city and county and shall, within five (5) working days, provide a notice of a change or location and address. In the event of noncompliance with the requirements of this Article 4.18.4, the Contractor shall have ten (10) days in which to comply, subsequent to receipt of written notice specifying in what respects the Contractor must comply herewith. Should noncompliance still be evident after such 10-day period, the Contractor shall, as a penalty to the District, forfeit One Hundred Dollars (\$100.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from any portion of the Contract Price then or thereafter due the Contractor. The Contractor is solely responsible for compliance with the foregoing provisions.

4.18.5 Hours of Work.

4.18.5.1 Limits on Hours of Work. Pursuant to California Labor Code §1810, eight (8) hours of labor shall constitute a legal day's work. Pursuant to California Labor Code §1811, the time of service of any worker employed at any time by the Contractor or by a Subcontractor, of any tier, upon the Work or upon any part of the Work, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereafter provided. Notwithstanding the foregoing provisions, Work performed by employees of Contractor or any Subcontractor, of any tier, in excess of eight (8) hours per day and forty (40) hours during any one week, shall be permitted upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (12) times the basic rate of pay.

4.18.5.2 Penalty for Excess Hours. The Contractor shall pay to the District a penalty of Twenty-five Dollars (\$25.00) for each worker employed on the Work by the Contractor or any Subcontractor, of any tier, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one calendar week, in violation of the provisions of the California Labor Code, unless compensation to the worker so employed by the Contractor is not less than one and one-half (12) times the basic rate of pay for all hours

worked in excess of eight (8) hours per day.

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

4.18.6 Apprentices.

4.18.6.1 Employment of Apprentices. Any apprentices employed to perform any of the Work shall be paid the standard wage paid to apprentices under the regulations of the craft or trade for which such apprentice is employed, and such individual shall be employed only for the work of the craft or trade to which such individual is registered. Only apprentices, as defined in California Labor Code §3077 who are in training under apprenticeship standards and written apprenticeship agreements under California Labor Code §§3070 et seq. are eligible to be employed for the Work. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which such apprentice is training.

4.18.6.2 Apprenticeship Certificate. When the Contractor or any Subcontractor, of any tier, in performing any of the Work employs workers in any Apprenticeable Craft or Trade, the Contractor and such Subcontractor shall apply to the Joint Apprenticeship Committee administering the apprenticeship standards of the craft or trade in the area of the site of the Work for a certificate approving the Contractor or such Subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected, provided, however, that the approval as established by the Joint Apprenticeship Committee or Committees shall be subject to the approval of the Administrator of Apprenticeship. The Joint Apprenticeship Committee or Committees, subsequent to approving the Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or such Subcontractor in order to comply with California Labor Code §1777.5. The Contractor and Subcontractors shall submit contract award information to the applicable Joint Apprenticeship Committee which shall include an estimate of journeyman hours to be performed under the Contract, the number of apprentices to be employed, and the approximate dates the apprentices will be employed. There shall be an affirmative duty upon the Joint Apprenticeship Committee or Committees, administering the apprenticeship standards of the crafts or trades in the area of the site of the Work, to ensure equal employment and affirmative action and apprenticeship for women and minorities. Contractors or Subcontractors shall not be required to submit individual applications for approval to local Joint Apprenticeship Committees provided they are already covered by the local apprenticeship standards.

4.18.6.3 Ratio of Apprentices to Journeymen. The ratio of Work performed by apprentices to journeymen, who shall be employed in the Work, may be the ratio stipulated in the apprenticeship standards under which the Joint Apprenticeship Committee operates, but in no case shall the ratio be less than one hour of apprentice work for each five hours of labor performed by a journeyman, except as otherwise provided in California Labor Code §1777.5. The minimum ratio for the land surveyor classification shall not be less than one apprentice for each five journeymen. Any ratio shall apply during any day or portion of a day when any journeyman, or the higher standard stipulated by the Joint Apprenticeship Committee, is employed at the site of the Work and shall be computed on the basis of the hours worked during the day by journeymen so employed, except for the land surveyor classification. The Contractor shall employ apprentices for the number of hours computed as above before the completion of the Work. The Contractor shall, however, endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the site of the Work. Where an hourly apprenticeship

ratio is not feasible for a particular craft or trade, the Division of Apprenticeship Standards, upon application of a Joint Apprenticeship Committee, may order a minimum ratio of not less than one apprentice for each five journeymen in a craft or trade classification. The Contractor or any Subcontractor covered by this Article and California Labor Code §1777.5, upon the issuance of the approval certificate, or if it has been previously approved in such craft or trade, shall employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the apprenticeship standards. Upon proper showing by the Contractor that it employs apprentices in such craft or trade in the State of California on all of its contracts on an annual average of not less than one apprentice to each five journeymen, the Division of Apprenticeship Standards may grant a certificate exempting the Contractor from the 1-to-5 ratio as set forth in this Article and California Labor Code §1777.5. This Article shall not apply to contracts of general contractors, or to contracts of specialty contractors not bidding for work through a general or prime contractor, involving less than Thirty Thousand Dollars (\$30,000.00) or twenty (20) working days. The term "Apprenticeable Craft or Trade," as used herein shall mean a craft or trade determined as an Apprenticeable occupation in accordance with rules and regulations prescribed by the Apprenticeship Council.

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

4.18.6.5 Contributions to Trust Funds. The Contractor or any Subcontractor, of any tier, who, performs any of the Work by employment of journeymen or apprentices in any Apprenticeable Craft or Trade and who is not contributing to a fund or funds to administer and conduct the apprenticeship program in any such craft or trade in the area of the site of the Work, to which fund or funds other contractors in the area of the site of the Work are contributing, shall contribute to the fund or funds in each craft or trade in which it employs journeymen or apprentices in the same amount or upon the same basis and in the same manner as the other contractors do, but where the trust fund administrators are unable to accept such funds, contractors not signatory to the trust agreement shall pay a like amount to the California Apprenticeship Council. The Division of Labor Standards Enforcement is authorized to enforce the payment of such contributions to such fund(s) as set forth in California Labor Code §227. Such contributions shall not result in an increase in the Contract Price.

4.18.6.6 Contractor's Compliance. The responsibility of compliance with this Article for all Apprenticeable Trades or Crafts is solely and exclusively that of the Contractor. All decisions of the Joint Apprenticeship Committee(s) under this Article are subject to the provisions of California Labor Code §3081. In the event the Contractor

willfully fails to comply with the provisions of this Article and California Labor Code §1777.5, pursuant to California Labor Code §1777.7, the Contractor shall: (i) be denied the right to bid on any public works contract for a period of one (1) year from the date the determination of non-compliance is made by the Administrator of Apprenticeship; and (ii) forfeit, as a civil penalty, Fifty Dollars (\$50.00) for each calendar day of noncompliance. Notwithstanding the provisions of California Labor Code §1727, upon receipt of such determination, the District shall withhold such amount from the Contract Price then due or to become due. Any such determination shall be issued after a full investigation, a fair and impartial hearing, and reasonable notice thereof in accordance with reasonable rules and procedures prescribed by the California Apprenticeship Council. Any funds withheld by the District pursuant to this Article shall be deposited in the General Fund or other similar fund of the District. The interpretation and enforcement of California Labor Code §§1777.5 and 1777.7 shall be in accordance with the rules and procedures of the California Apprenticeship Council.

4.18.7 Employment of Independent Contractors. Pursuant to California Labor Code §1021.5, Contractor shall not willingly and knowingly enter into any agreement with any person, as an independent contractor, to provide any services in connection with the Work where the services provided or to be provided requires that such person hold a valid contractors' license issued pursuant to California Business and Professions Code §§7000 et seq. and such person does not meet the burden of proof of his/her independent contractor status pursuant to California Labor Code §2750.5. In the event that Contractor shall employ any person in violation of the foregoing, Contractor shall be subject to the civil penalties under California Labor Code §1021.5 and any other penalty provided by law. In addition to the penalties provided under California Labor Code §1021.5, Contractor's violation of this Article 4.18.7 or the provisions of California Labor Code §1021.5 shall be deemed an event of Contractor's default under Article 15.1 of these General Conditions. The Contractor shall require Subcontractors performing or providing any portion of the Work to adhere to and comply with the foregoing provisions.

4.19 Assignment of Antitrust Claims. Pursuant to California Government Code §4551, the Contractor and its Subcontractor(s), of any tier, hereby offers and agrees to assign to the District all rights, title and interest in and to all causes of action they may have under Section 4 of the Clayton Act, (15 U.S.C. §15) or under the Cartwright Act (California Business and Professions Code §§16700 et seq.), arising from purchases of goods, services or materials hereunder or any Subcontract. This assignment shall be made and become effective at the time the District tenders Final Payment to the Contractor, without further acknowledgment by the parties. If the District receives, either through judgment or settlement, a monetary recovery in connection with a cause of action assigned under California Government Code §§4550 et seq., the assignor thereof shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the District any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the District as part of the Contract Price, less the expenses incurred by the District in obtaining that portion of the recovery. Upon demand in writing by the assignor, the District shall, within one year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose: and (i) the District has not been injured thereby; or (ii) the District declines to file a court action for the cause of action.

4.20 Limitations Upon Site Activities. Except in the circumstances of an emergency, no construction activities shall be permitted at or about the Site except during the District's hours and days set forth in the Special Conditions. Work performed outside of the hours and days noted in the Special Conditions will not result in adjustment of the Contract Time or the Contract Price; unless

Work outside of the hours and days noted in the Special Conditions is expressly authorized by the District.

4.21 Progress Reports: DSA Verified Reports.

4.21.1 DSA Verified Reports: Contractor Actions. A material obligation of the Contractor is the completion by the Contractor of all actions and activities which by the Contract Documents or by the Laws are the responsibility of the Contractor relating to DSA reporting requirements pursuant to Education Code §81141 (including amendments thereto) and issuance of DSA's Certificate of Compliance for the Project pursuant to Education Code §81147 (including amendments thereto) upon completion of the Work. The foregoing shall include without limitation, the timely preparation, completion and filing of Verified Reports during Project construction and the filing of the Final Verified Report with DSA within ten (10) days of the determination of Final Completion. Concurrently with submittal to DSA, the Contractor shall provide the District, District's Inspector, Architect and Construction Manager with copies of all Verified Reports completed by the Contractor and submitted to DSA.

4.21.2 District Withholdings From Final Payment. The completion and filing of the Final Verified Report with DSA by the Contractor is an express condition precedent to the District's disbursement of the Final Payment. If the Contractor fails to prepare and file the Final Verified Report with DSA within ten (10) days of the determination of Final Completion, the District may in the sole and exclusive discretion of the District retain and withhold an amount not to exceed ten percent (10%) of the Final Payment from disbursement to the Contractor as damages for the failure of the Contractor to have timely and completely discharged its obligations hereunder. The Contractor acknowledges and agrees that the foregoing withholdings by the District is a reasonable estimate of the damages and other losses the District will sustain due to the failure of the Contractor to have timely and fully discharged its obligations hereunder.

4.21.3 Progress Reports. Progress Reports shall be completed by the Contractor for each day of construction activities at the Site and submitted to the District or Project Manager not later than 9:00 A.M. of the ensuing business day.

ARTICLE 5: SUBCONTRACTORS

5.1 Subcontracts. Any Work performed for the Contractor by a Subcontractor shall be pursuant to a written agreement between the Contractor and such Subcontractor which specifically incorporates by reference the Contract Documents and which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents, including without limitation, the policies of insurance required under Article 6 of these General Conditions and obligates the Subcontractor to assume toward the Contractor all the obligations and responsibilities of the Contractor which by the Contract Documents the Contractor assumes toward the District and the Architect. The foregoing notwithstanding, no contractual relationship shall exist, or be deemed to exist, between any Subcontractor and the District, unless the Contract is terminated and District, in writing, elects to assume the Subcontract. Each Subcontract for a portion of the Work shall provide that such Subcontract may be assigned to the District if the Contract is terminated by the District pursuant to Article 15 hereof, subject to the prior rights of the Surety if the District terminates the Contract for the Contractor's default. The Contractor shall provide to the District copies of all executed Subcontracts and Purchase Orders to which Contractor is a party within thirty (30) days after Contractor's execution of the Agreement. During performance of the Work, the Contractor shall, from time to time, as and when requested by the District, the Architect or the Project Manager provide the District with copies of any and all Subcontracts or Purchase Orders relating to the Work and all modifications thereto. The Contractor's failure or refusal, for any reason, to provide copies of such Subcontracts or Purchase Orders in accordance with the two preceding sentences is Contractor's default of a material term of the Contract Documents.

5.2 Subcontractor DIR Contractor Registration.

5.2.1 No Subcontractor Performance of Work Without DIR Registration. No portion of the Work is permitted to be performed by a Subcontractor unless the Subcontractor is a DIR Registered contractor. The foregoing DIR contractor registration requirement is applicable for all Subcontractors, including without limitation, lower tier Subcontractors and Subcontractors who are not identified in the Contractor's Subcontractors List.

5.2.2 Contractor Obligation to Verify Subcontractor DIR Registration Status. An affirmative and on-going obligation of the Contractor under the Contract Documents is the Contractor's verification that all Subcontractors are at all times during performance of the Work in full and strict compliance with DIR contractor registration requirements. The Contractor shall not permit or allow any Subcontractor to perform any Work without the Contractor's verification that the Subcontractor is in full and strict compliance with DIR contractor registration requirements.

5.2.3 Contractor Obligation to Request Substitution of Listed Subcontractor Who Is Not DIR Registered Contractor. If any Subcontractor identified in the Contractor's Subcontractors List submitted with the Contractor's proposal for the Work is not a DIR registered contractor at the time of opening of proposals for the Work or if a Subcontractor's DIR contractor registration lapses prior to or during a Subcontractor's performance of Work, the Contractor shall request the District's consent to substitute the Subcontractor who is not a DIR registered contractor pursuant to Labor Code §1771.1(c)(3) and/or Labor Code §1771.1(d).

5.3 Substitution of Listed Subcontractor.

5.3.1 Substitution Process. Request of the Contractor to substitute a listed Subcontractor will be considered only if in strict conformity with this Article 5.2 and California Public Contract Code §4107. All costs incurred by the District, including without limitation, costs of the District's Inspector, the Architect, the Project Manager or attorneys' fees in the review and evaluation of a request to substitute a listed Subcontractor shall be borne by the Contractor; such costs may be deducted by the District from the Contract Price then or thereafter due the Contractor.

5.3.2 Responsibilities of Contractor Upon Substitution of Subcontractor. The District's consent to Contractor's substitution of a listed Subcontractor shall not relieve Contractor from its obligation to complete the Work within the Contract Time and for the Contract Price. The substitution of a listed Subcontractor shall not, under any circumstance, result in, or give rise to any to any increase of the Contract Price or the Contract Time on account of such substitution. If the District consents to substitution of a listed Subcontractor, the Architect shall determine the extent to which, if any, revised or additional Submittals will be required of the newly substituted Subcontractor ("Substituted Subcontractor"). If the Architect determines that revised or additional Submittals are required of a Substituted Subcontractor, the Architect shall promptly notify the Contractor, in writing, of such requirement. In such event, revised or additional Submittals shall be submitted to Architect not later than thirty (30) days following the date of the Architect's written notice to the Contractor pursuant to the foregoing sentence; provided that if in the reasonable and good faith judgment of the Architect, the progress of the Work or completion of the Work requires submission of additional or revised Submittals by a Substituted Subcontractor in less than thirty (30) days, the Architect shall so state in its written notice to the Contractor. If the revised or additional Submittals are not submitted by Contractor within thirty (30) days, or such earlier time as determined by the Architect pursuant to the preceding sentence, following the Architect's written notice of the requirement for revised or additional Submittals, Contractor shall be subject to the per diem assessments for late Submittals as set forth in Article 4.7.2.1 of these General Conditions. Any revised or additional Submittals required pursuant to this Article 5.3.2 shall conform to the requirements of Article 4.7 of these General Conditions. Contractor shall reimburse the District for all fees and costs, including without limitation fees of the Architect, the District's administrative costs and DSA fees, incurred or associated with the processing, review and evaluation of any revised or additional Submittals required pursuant to this Article 5.3.2; the District may deduct such fees and costs from any portion of the Contract Price then or thereafter due the Contractor. In the event that additional

or revised Submittals are required pursuant to this Article 5.3.2, such requirement shall not result in an increase to the Contract Time or the Contract Price.

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

ARTICLE 6: INSURANCE; INDEMNITY; BONDS

- 6.1 Workers' Compensation Insurance; Employer's Liability Insurance. The Contractor shall purchase and maintain Workers' Compensation Insurance as will protect the Contractor from claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Contractor shall purchase and maintain Employer's Liability Insurance covering bodily injury (including death) by accident or disease to any employee which arises out of the employee's employment by Contractor. The Employer's Liability Insurance required of Contractor hereunder may be obtained by Contractor as a separate policy of insurance or as an additional coverage under the Workers' Compensation Insurance required to be obtained and maintained by Contractor hereunder. The limits of liability for the Employer's Liability Insurance required hereunder shall be as set forth in the Special Conditions.
- 6.2 Commercial General Liability. The Contractor shall purchase and maintain Commercial General Liability, including coverage for the types of claims set forth below which may arise out of or result from Contractor's performance of the Work: (i) claims for damages because of bodily injury, sickness or disease or death of any person other than the Contractor's employees; (ii) claims for damages insured by usual personal injury liability coverage; (iii) claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; (iv) claims for damages because of bodily injury, death of a person or property damages arising out of ownership, maintenance or use of a motor vehicle; (v) contractual liability insurance applicable to the Contractor's obligations under the Contract Documents; (vi) Completed Operations; and (vii) Contractor's Pollution Liability.
- 6.3 Builder's Risk "All-Risk" Insurance. The Contractor, during the progress of the Work and until Final Acceptance of all Work by the District, shall maintain Builder's Risk "All-Risk" Completed Value Insurance Coverage on all insurable Work included under the Contract Documents which coverage is to provide extended coverage and insurance against vandalism and malicious mischief, perils of fire, sprinkler leakage, civil authority, sonic boom, collapse and flood upon the entire Work which is the subject of the Contract Documents, and including completed Work and Work in progress to the full insurable value thereof. Contractor's Builders Risk Insurance shall include coverage and insurance against the perils of earthquake if so indicated in the Special Conditions. Such insurance shall include the District as an additional named insured, and any other person with an insurable interest designated by the District as an additional named insured. The risk of damage to the Work due to the perils covered by the Builder's Risk "All Risk" Insurance, as well as any other hazard which might result in damage to the Work, is that of the

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

6.4 Insurance Requirements.

6.4.1 Coverage Limits. Minimum coverage limits for each policy of insurance required of the Contractor hereunder are set forth in the Special Conditions.

6.4.2 Deductibles. The Contractor is solely and exclusively responsible for the payment of deductibles, if any, under any policy of insurance required of the Contractor hereunder, without adjustment to the Contract Price on account thereof.

6.4.3 No Modification or Cancellation Without Prior Notice to District. Coverages afforded under policies of insurance required of the Contractor shall include provisions to the effect that coverage thereunder will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to the District. Should any policy of insurance be canceled before Final Acceptance of the Work by the District and the Contractor fails to immediately procure replacement insurance as required, the District reserves the right to procure such insurance and to deduct the premium cost thereof and other costs incurred by the District in connection therewith from any sum then or thereafter due the Contractor under the Contract Documents.

6.4.4 District Additional Insured. The District shall be an additional insured under the Contractor's Commercial Liability and Builders Risk policies of insurance. The additional Insured acknowledgement shall be submitted as a separate declaration from the Contractor's insurance provider (ACCORD form modifications are not acceptable).

6.4.5 Certificates of Insurance. Prior to commencing the Work, Contractor shall deliver to the District Certificates of Insurance evidencing the insurance coverages required by the Contract Documents. Failure or refusal of the Contractor to so deliver Certificates of Insurance may be deemed by the District to be a default of a material obligation of the Contractor under the Contract Documents, and thereupon the District may proceed to exercise any right or remedy provided for under the Contract Documents or at law. The Contractor shall, from time to time, furnish the District, when requested, with satisfactory proof of coverage of each type of insurance required by the Contract Documents; failure of the Contractor to comply with the District's request may be deemed by the District to be a default of a material obligation of the Contractor under the Contract Documents.

6.5 Subcontractors' Insurance. Contractor shall require that every Subcontractor, to obtain and maintain the policies of insurance set forth in Articles 6.1, 6.2 and 6.4 of these General Conditions; the coverages and limits of liability of such policies of insurance to be obtained and maintained by Subcontractors shall be as set forth in the Special Conditions. The policies of insurance to be obtained and maintained by Subcontractors hereunder are in addition to, and not in lieu of, Contractor obtaining and maintaining such policies of insurance. Each of the policies of insurance obtained and maintained by a Subcontractor hereunder shall conform with the requirements of this Article 6. Upon request of the District, Contractor shall promptly deliver to the District Certificates of Insurance evidencing that the Subcontractors have obtained and maintained policies of insurance in conformity with the requirements of this Article 6. Failure or refusal of the Contractor to provide the District with Subcontractors' Certificates of Insurance evidencing the insurance coverages required hereunder is a material default of Contractor hereunder.

6.6 Maintenance of Insurance. Any insurance bearing on the adequacy of performance of Work shall be maintained after the District's Final Acceptance of all of the Work for the full one year correction of Work period and any longer specific guarantee or warranty periods set forth in the Contract Documents. Should such insurance be canceled before the end of any such periods and the Contractor fails to immediately procure replacement insurance as specified, the District reserves the right to procure such insurance and to charge the cost thereof to the Contractor. Nothing contained

in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from its operations or performance of the Work under the Contract Documents, including without limitation the Contractor's obligation to pay Liquidated Damages. In no instance will the District's exercise of its option to occupy and use completed portions of the Work relieve the Contractor of its obligation to maintain insurance required under this Article until the date of Final Acceptance of the Work by the District, or such time thereafter as required by the Contract Documents. The insurer providing any insurance coverage required hereunder shall be to the reasonable satisfaction of the District.

- 6.7 Contractor's Insurance Primary. All insurance and the coverages thereunder required to be obtained and maintained by Contractor hereunder, if overlapping with any policy of insurance maintained by the District, shall be deemed to be primary and non-contributing with any policy maintained by the District and any policy or coverage thereunder maintained by District shall be deemed excess insurance. To the extent that the District maintains a policy of insurance covering property damage arising out of the perils of fire or other casualty covered by the Contractor's Builder's Risk Insurance or the Comprehensive General Liability Insurance of the Contractor or any Subcontractor, the District, Contractor and all Subcontractors waive rights of subrogation against the others. The costs for obtaining and maintaining the insurance coverages required herein shall be included in the Contract Price.
- 6.8 Indemnity. Unless arising solely out of the active negligence, gross negligence or willful misconduct the District or the Architect, the Contractor shall indemnify, defend and hold harmless the Indemnified Parties who are: (i) the District and its Board of Trustees, officers, employees, agents and representatives (including the District's Inspector); (ii) the Architect its respective agents and employees; and (iii) if one is designated by the District for the Work, the Project Manager and its agents and employees. The Contractor's obligations hereunder includes indemnity, defense and hold harmless of the Indemnified Parties from and against any and all damages, losses, claims, demands or liabilities whether for damages, losses or other relief, including, without limitation attorneys' fees and costs which arise, in whole or in part, from the Work, the Contract Documents or the negligent, grossly negligent or willful acts, omissions or other conduct of the Contractor, any Subcontractor or any person or entity engaged by them for the Work. The Contractor's obligations under the foregoing include without limitation: (i) injuries to or death of persons; (ii) damage to property; or (iii) theft or loss of property; (iv) Stop Payment Notice claims asserted by any person or entity in connection with the Work; and (v) other losses, liabilities, damages or costs resulting from, in whole or part, any acts, omissions or other conduct of Contractor, any of Contractor's Subcontractors, of any tier, or any other person or entity employed directly or indirectly by Contractor in connection with the Work and their respective agents, officers or employees. If any action or proceeding, whether judicial, administrative, arbitration or otherwise, shall be commenced on account of any claim, demand or liability subject to Contractor's obligations hereunder, and such action or proceeding names any of the Indemnified Parties as a party thereto, the Contractor shall, at its sole cost and expense, defend the named Indemnified Parties in such action or proceeding with counsel reasonably satisfactory to the named Indemnified Parties. In the event that there shall be any judgment, award, ruling, settlement, or other relief arising out of any such action or proceeding to which any of the Indemnified Parties are bound by, Contractor shall pay, satisfy or otherwise discharge any such judgment, award, ruling, settlement or relief; Contractor shall indemnify and hold harmless the Indemnified Parties from any and all liability or responsibility arising out of any such judgment, award, ruling, settlement or relief. The Contractor's obligations hereunder are binding upon Contractor's Performance Bond Surety and these obligations shall survive notwithstanding Contractor's completion of the Work or the termination of the Contract.
- 6.9 Payment Bond; Performance Bond. Prior to commencement of the Work, the Contractor shall furnish a Performance Bond as security for Contractor's faithful performance of the Contract and a Labor and Material Payment Bond as security for payment of persons or entities performing work, labor or

furnishing materials in connection with Contractor's performance of the Work under the Contract Documents. Unless otherwise stated in the Special Conditions, the amounts of the Performance Bond and the Payment Bond required hereunder shall be one hundred percent (100%) of the Contract Price. Said Labor and Material Payment Bond and Performance Bond shall be in the form and content set forth in the Contract Documents. The failure or refusal of the Contractor to furnish either the Performance Bond or the Labor and Material Payment Bond in strict conformity with this Article 6.9 may be deemed by the District as a default by the Contractor of a material obligation hereunder. The Surety on any bond required under the Contract Documents shall be an Admitted Surety Insurer as that term is defined in California Code of Civil Procedure §995.120.

ARTICLE 7: CONTRACT TIME

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

7.2 Progress and Completion of the Work.

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

7.2.2 Correction and Completion of Project Work per bid documents, plans and specifications Prior to One Hundred Percent Completion.

7.2.2.1 Punchlist. Upon achieving Completion of the Work, the District, the District's Inspector, the Project Manager, if any, the Architect and the Contractor shall jointly inspect the Work and prepare a comprehensive list of items of the Work to be corrected or completed by the Contractor ("the Punchlist"). The exclusion of, or failure to include, any item on the Punchlist shall not alter or limit the obligation of the Contractor to complete or correct any portion of the Work in accordance with the Contract Documents.

7.2.2.2 Time for Completing Punchlist Items. In addition to establishing the Punchlist items pursuant to Article 7.2.3.1, the Project Manager, if any, Contractor and Architect shall, after the joint inspection, establish a reasonable time for Contractor's completion of all Punchlist items. If mutual agreement is not reached to establish the time for the Contractor's completion of Punchlist items, the Architect shall determine such time, and in such event, the time determined by the Architect shall be final and binding upon the District and Contractor so long as the Architect's determination is made in good faith. The Contractor shall promptly and diligently proceed to complete all Punchlist items within the time established. If the Contractor fails or refuses, for any reason, to complete all Punchlist items within the time established, Contractor shall be subject to assessment of Liquidated Damages in accordance with Article 7.4 hereof. The foregoing notwithstanding, if the Contractor fails or refuses to complete all Punchlist items, the District may in its sole and exclusive discretion and without further notice to Contractor, elect to cause the completion of all remaining Punchlist items provided, however that such election by the District is in addition to and not in lieu of any other right or remedy of the District under the Contract Documents or at law. If the District elects to complete Punchlist items of the Work, pursuant to the foregoing, Contractor shall be responsible

for all costs incurred by the District in connection herewith and the District may deduct such costs from the Contract Price then or thereafter due the Contractor, if these costs exceed the remaining Contract Price due to the Contractor, the Contractor and the Performance Bond Surety are jointly and severally liable to District for any such excess costs.

7.2.3 One Hundred Percent Completion. Completion is that stage in the progress of the Work when the Work or any designated portion thereof (whether described as milestones, phases, segments or other similar terms) is complete in accordance with the Contract Documents so the District can occupy or use the Work for its intended purpose. Completion shall be determined by the Architect, Project Manager, if any, and the District's Inspector upon request by the Contractor in accordance with the Contract Documents. The good faith and reasonable determination of Completion by the District's Inspector, Project Manager, if any and the Architect shall be controlling and final.

7.2.4 Contractor Responsibility for Multiple Inspections. If the Contractor requests determination of Completion or Final Completion by the District's Inspector, Project Manager, if any, and the Architect and it is determined by the District's Inspector, Project Manager, if any, or the Architect that the Work does not then justify certification of Completion or Final Completion and re-inspection is required at a subsequent time to make such determination, the Contractor shall be responsible for all costs of such re-inspection, including without limitation, the fees of the Architect, Project Manager, if any, and the District's Inspector. The District may deduct such costs from the Contract Price then due or thereafter due to the Contractor.

7.2.5 Final Acceptance. Final Acceptance of the Work shall occur upon approval of the Work by the District's Board of Trustees; such approval shall be submitted for adoption at the next regularly scheduled meeting of the District's Board of Trustees after the determination of Final Completion. The commencement of any warranty or guarantee period under the Contract Documents is the date upon which the District's Board of Trustees approves of the Final Acceptance of the Work.

7.3 Construction Schedule.

7.3.1 Submittal of Preliminary Construction Schedule. Within five (14) days following execution of the Agreement, the Contractor shall prepare and submit to the District, the Project Manager, if any, and the Architect a Preliminary Construction Schedule indicating, in graphic form, the estimated rate of progress and sequence of all Work required under the Contract Documents. The purpose of the Preliminary Construction Schedule is to assure adequate planning and execution of the Work so that it is completed within the Contract Time and to permit evaluation of the progress of the Work. Unless otherwise provided in the Special Conditions, the Construction Schedules required under this Article 7 shall; (i) be prepared with a commercially available computer software program in a critical path format; (ii) indicate the date(s) for commencement and completion of various portions of the Work including without limitation, procurement, fabrication and delivery of major items, materials or equipment; (iii) indicate manpower and other resources required for completion of each Construction Schedule activity; (iv) indicate costs for completion of each Construction Schedule activity; (v) identify each Submittal required by the Contract Documents, the date for the Contractor's submission of each Submittal and the date for the return of the reviewed Submittal to the Contractor. The Contractor may submit a Preliminary Construction Schedule depicting completion of the Work in a duration shorter than the Contract Time; provided that such Preliminary Construction Schedule shall not be a basis for adjustment to the Contract Price in the event that completion of the Work shall occur after the time depicted therein, nor shall such Preliminary Construction Schedule be the basis for any extension of the Contract Time, the Contractor's entitlement to any extension of the Contract Time shall be based upon the Contract Time and not on any shorter duration which may be depicted in the Contractor's Preliminary Construction Schedule. If the Construction

Schedules required under this Article 7.3 incorporate therein any “float” time, such float shall be deemed to jointly belong to and owned by the District and the Contractor. As used herein, “float time” shall be deemed to refer to the time between earliest finish date and the latest finish date of each activity shown on the Construction Schedule.

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

7.3.3 Preparation and Submittal of Contract Construction Schedule. Within ten (21) days of the District’s return of the Preliminary Construction Schedule to the Contractor pursuant to Article 7.3.2 above, the Contractor shall prepare and submit to the Architect and the Project Manager, if any, the Construction Schedule which incorporates therein the comments to the Preliminary Construction Schedule. Upon the Contractor’s submittal of such Construction Schedule, the District, the Project Manager and the Architect shall review the same for purposes of determining conformity with the requirements of the Contract Documents. Within fifteen (15) days of the receipt of the Construction Schedule, the District will approve such Construction Schedule or will return the same to the Contractor with comments to the form or content. In the event there are comments to the form or content thereof, the Contractor, shall within seven (7) days of receipt of such comments, revise and resubmit the Construction Schedule incorporating therein such comments. Upon the District’s approval of the form and content of a Construction Schedule, the same shall be deemed the “Approved Construction Schedule.” The District’s approval of a Construction Schedule shall be for the sole and limited purpose of determining conformity with the requirements of the Contract Documents. By the Approved Construction Schedule, the District shall not be deemed to have exercised control over, or approval of, construction means, methods or sequences, all of which remain the responsibility and obligation of the Contractor in accordance with the terms of the Contract Documents. Further, the Approved Construction Schedule shall not operate to limit or restrict any of Contractor’s obligations under the Contract Documents nor relieve the Contractor from the full, faithful and timely performance of such obligations in accordance with the terms of the Contract Documents. The activities, commencement and completion dates of activities, and the sequencing of activities depicted on the Approved Construction Schedule shall not be modified or revised by the Contractor without the prior consent, or direction, of the District and the Architect. Updates to the Approved Construction Schedule pursuant to Article 7.3.5 below shall not be deemed revisions to the Approved Construction Schedule. If the Approved Construction Schedule depicts completion of the Work in a duration shorter than the Contract Time, the same shall not be a basis for an adjustment of the Contract Time or the Contract Price in the event that actual completion of the Work shall occur after such the time depicted in such Approved Construction Schedule. In such event, the Contract Price shall not be subject to adjustment on account of any additional costs incurred by the Contractor to complete the Work prior to the Contract Time, as adjusted in accordance with the terms of the Contract Documents. Any adjustment of the Contract Time or the Contract Price shall be based upon the Contract Time set forth in the Contract Documents and not any shorter duration which may depicted in the Approved Construction Schedule.

7.3.4 Revisions to Approved Construction Schedule. In the event that the progress of the Work or the sequencing of the activities of the Work shall materially differ from that indicated in the Approved Construction Schedule, as determined by the District in its reasonable discretion

and judgment, the District may direct the Contractor to revise the Approved Construction Schedule; within fifteen (15) days of the District's direction, the Contractor shall prepare and submit to the Architect and the Project Manager a revised Approved Construction Schedule, for review and approval by the District. The Contractor may request consent of the District to revise the Approved Construction Schedule. Any such request shall be considered by the District only if in writing setting forth the Contractor's proposed revision(s) to the Approved Construction Schedule and the reason(s) therefor. The District may consent to, or deny, any such request of the Contractor to revise the Approved Construction Schedule in its reasonable discretion.

7.3.5 Updates to Approved Construction Schedule. The Contractor shall monitor and update the Approved Construction Schedule on a monthly basis, or more frequently as required by the conditions or progress of the Work, or as may be requested by the District. The Contractor shall provide the District, the Project Manager and the Architect with updated Approved Construction Schedules indicating progress achieved and activities commenced or completed within the prior updated Approved Construction Schedule. Updates to the Approved Construction Schedule shall not include any revisions to the activities, commencement and completion dates of activities or the sequencing of activities depicted on the Approved Construction Schedule. Any such revisions to the Approved Construction Schedule shall result in the District's rejection of such update and Contractor shall, within seven (7) days of the District's rejection of such update, submit to the Architect and the Project Manager an Updated Approved Construction Schedule which does not incorporate any such revisions. If requested by the District, the Contractor shall also submit, with its updates to the Approved Construction Schedule a narrative statement including a description of current and anticipated problem areas of the Work, delaying factors and their impact, and an explanation of corrective action taken or proposed by the Contractor. If the progress of the Work is behind the Approved Construction Schedule, the Contractor shall indicate what measures will be taken to place the Work back on schedule. The District may, from time to time, and in the District's sole and exclusive discretion, transmit to the Contractor's Performance Bond Surety the Approved Construction Schedule, any updates thereof and the narrative statement described hereinabove. The District's election to transmit, or not to transmit such information, to the Contractor's Performance Bond Surety shall not limit the Contractor's obligations under the Contract Documents.

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

7.4 Adjustment of Contract Time. If Completion is delayed, adjustment, if any, to the Contract Time on account of such delay shall be in accordance with this Article 7.4.

7.4.1 Excusable Delays. If 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 Architect; Excusable Delays shall not result in any increase in the Contract Price. Excusable Delays refer to unforeseeable and unavoidable casualties or other unforeseen causes beyond the control, and without fault or neglect, of the Contractor, any Subcontractor, Material Supplier or other person directly or indirectly engaged by the Contractor in performance of any portion of the Work. Excusable Delays include unanticipated and unavoidable labor disputes, unusual and unanticipated delays in transportation of equipment, materials or Construction Equipment reasonably necessary for completion and proper execution of the Work, unanticipated unusually severe weather conditions or DSA directive to stop the Work. Neither

the financial resources of the Contractor or any person or entity directly or indirectly engaged by the Contractor in performance of any portion of the Work shall be deemed conditions beyond the control of the Contractor. If an event of Excusable Delay occurs, the Contract Time shall be subject to adjustment hereunder only if the Contractor establishes: (i) full compliance with all applicable provisions of the Contract Documents relative to the method, manner and time for Contractor's notice and request for adjustment of the Contract Time; (ii) that the event(s) forming the basis for Contractor's request to adjust the Contract Time are outside the reasonable control and without any fault or neglect of the Contractor or any person or entity directly or indirectly engaged by Contractor in performance of any portion of the Work; and (iii) that the event(s) forming the basis for Contractor's request to adjust the Contract Time directly and adversely impacted the progress of the Work as indicated in the Approved Construction Schedule or the most recent updated Approved Construction Schedule relative to the date(s) of the claimed event(s) of Excusable Delay. The foregoing provisions notwithstanding, if the Special Conditions set forth a number of "Rain Days" to be anticipated during performance of the Work, the Contract Time shall not be adjusted for rain related unusually severe weather conditions until and unless the actual number of Rain Days during performance of the Work exceeds those noted in the Special Conditions and such additional Rain Days directly and adversely impact the critical path progress of the Work as depicted in the Approved Construction Schedule or the most recent updated Approved Construction Schedule relative to the date(s) of such additional Rain Days.

7.4.2 Compensable Delays. If Completion of the Work is delayed and such delay is caused by the acts or omissions of the District, the Architect, or separate contractor employed by the District (collectively "Compensable Delays"), upon Contractor's request and notice, in strict conformity with Articles 7 and 9 of these General Conditions, the Contract Time will be adjusted by Change Order for such reasonable period of time as determined by the Architect and the District. In accordance with California Public Contract Code §7102, if the Contractor's progress is delayed by any of the events described in the preceding sentence, Contractor shall not be precluded from the recovery of damages directly and proximately resulting therefrom, provided that the District is liable for the delay, the delay is unreasonable under the circumstances involved and the delay was not within the reasonable contemplation of the District and the Contractor at the time of execution of the Agreement. In such event, Contractor's damages, if any, shall be limited to direct, actual and unavoidable additional costs of labor, materials or Construction Equipment directly resulting from such delay, and shall exclude indirect or other consequential damages, including without limitation, home office expenses, bond capacity impairment or loss of prospective economic advantage. Except as expressly provided for herein, Contractor shall not have any other claim, demand or right to adjustment of the Contract Price arising out of delay, interruption, hindrance or disruption to the progress of the Work. Adjustments to the Contract Price and the Contract Time, if any, on account of Changes to the Work or Suspension of the Work shall be governed by the applicable provisions of the Contract Documents, including without limitation, Articles 9 and 14 of these General Conditions.

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

7.4.4 Adjustment of Contract Time.

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

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

- 7.5 Liquidated Damages. Should the Contractor neglect, fail or refuse to: (i) submit Submittals in accordance with the Approved Construction Schedule; (ii) achieve Completion of the Work or designated portions thereof within the Contract Time, (subject to adjustments authorized under the Contract Documents); (iii) or to complete Punchlist items within the time established pursuant to the Contract Documents, the Contractor agrees to pay to the District the amount of per diem Liquidated Damages set forth in the Special Conditions, not as a penalty but as Liquidated Damages, for every day beyond the Contract Time, as adjusted, until Submittals are submitted, Completion or completion of the Punchlist items are achieved. The Liquidated Damages amounts set forth in the Special Conditions are agreed upon by and between the Contractor and the District because of the difficulty of fixing the District's actual damages in the event of delayed submission of Submittals, Completion or completion of Punchlist items. The Contractor and the District specifically agree that said amounts are reasonable estimates of the District's damages in such event, and that such amounts do not constitute a penalty. Liquidated Damages may be deducted from the Contract Price then or thereafter due the Contractor. The Contractor and the Surety shall be liable to the District for any Liquidated Damages exceeding any amount of the Contract Price then held or retained by the District. In the event that the Contractor shall fail or refuse to complete Punchlist items and the District elects to exercise its right to cause completion or correction of such items pursuant to Article 7.2.3.2 hereof, the District's assessment of Liquidated Damages pursuant to the foregoing shall be in addition, and not in lieu of, the District's right to charge Contractor with the cost of completing or correcting such items of the Work, as provided for under Article 7.2.3.2. The Contractor and the District acknowledge and agree that the provisions of this Article 7.5 are reasonable under the circumstances existing at the time of the Contractor's execution of the Agreement.

ARTICLE 8: CONTRACT PRICE

- 8.1 Contract Price. The Contract Price is the amount stated in the Agreement and subject to adjustments thereto in accordance with the Contract Documents, is the total amount payable by the District to the Contractor for completion of the Work and other obligations of the Contractor under the Contract Documents. The District's payment of the Contract Price to the Contractor shall be in accordance with the Contract Documents.
- 8.2 Cost Breakdown. Within fifteen (15) days of the execution of the Agreement by Contractor, Contractor shall furnish, in a form acceptable to the District, a detailed estimate and complete Cost Breakdown of the Contract Price. The Cost Breakdown is subject to the District's review

and approval of the form and content thereof. If the District objects to any portion of the Cost Breakdown, within ten (10) days of the District's receipt of the Cost Breakdown, the District shall notify the Contractor, in writing of the District's objection(s) to the Cost Breakdown. Within five (5) days of the date of the District's written objection(s), Contractor shall submit a revised Cost Breakdown to the District for review and approval. The foregoing procedure for the preparation, review and approval of the Cost Breakdown shall continue until the District has approved of the entirety of the Cost Breakdown. Upon the District's approval of the Cost Breakdown, the Cost Breakdown shall not be thereafter modified or amended by the Contractor without the prior consent and approval of the District, which may be granted, conditioned or withheld in the sole discretion of the District. Notwithstanding any provision of the Contract Documents to the contrary, payment of the Contractor's overhead, supervision and general conditions costs and profit, as such items are reflected in the Cost Breakdown, shall be made by the District in equal installments with its disbursements of Progress Payments and the Final Payment with the amount of each such installment equal to the aggregate amount of such items as reflected in the Cost Breakdown divided by the number of months of the Contract Time.

8.3 Progress Payments.

8.3.1 Applications for Progress Payments. During the Contractor's performance of the Work, the Contractor shall submit monthly, on the first working day of each month, to the District, District's Inspector, Project Manager, if any, and the Architect, Applications for Progress Payments ("Payment Applications"), on forms approved by the District, setting forth an itemized estimate of Work completed in the preceding month for the purpose of the District's making of Progress Payments thereon. Values utilized in the Payment Applications shall be based upon the District approved Cost Breakdown pursuant to Article 8.2 above provided that such values are only for determining the basis of Progress Payments to Contractor, and shall not be considered as fixing a basis for adjustments, whether additive or deductive, to the Contract Price, or for determining the extent of Work actually completed.

8.3.2 Payment Application Review for Determination of Proper Payment Application. Pursuant to Public Contract Code §20104.50, upon receipt of a Payment Application, the District's Inspector, the Project Manager, if any, and the Architect will review the Payment Application as soon as practicable for the purpose of determining that the Payment Application is a proper Payment Application. A Payment Application is "proper" only if information required by the form of Payment Application is completely and accurately provided by the Contractor and the Payment Application is accompanied by: (i) a summary listing of the Subcontractors/Material Suppliers entitled to payment of any portion of the requested Progress Payment, along with the amount of payment each Subcontractor/Material Supplier is entitled to receive from the Contractor from the proceeds of the requested Progress Payment; (ii) completed and executed form of Verification of Certified Payroll Records Submittal To Labor Commissioner; (iii) duly completed and executed forms of Conditional Waiver and Release of Rights Upon Progress Payment in accordance with California Civil Code §8132 of the Contractor and Subcontractors/Material Suppliers covering the Progress Payment requested; (iv) duly completed and executed forms of Unconditional Waiver and Release of Rights upon Progress Payment in accordance with California Civil Code §8134 of the Contractor and Subcontractors/Material Suppliers covering the Progress Payment received by the Contractor under the immediately preceding Payment Application; (v) if applicable, a current union statement reflecting that the Contractor and Subcontractors are current in the payment of any supplemental fringe benefits required pursuant to any collective bargaining agreement to which the Contractor or any such Subcontractor is a party to or is otherwise bound by; and (vi) a certification by the Contractor that it has continuously maintained the Record Drawings reflecting the actual as-built conditions of the Work performed be for which the Progress Payment is requested, it being understood that such certification is subject to verification by the District, Architect or the Project Manager prior to disbursement of the Progress Payment. Pursuant to

Public Contract Code §20104.50, if a Payment Application determined by the District not to be a proper Payment Application it shall be returned by the District to the Contractor as soon as is practicable after receipt thereof, but in no event not more than seven (7) days after receipt. The District's return of any Payment Application pursuant to the preceding sentence shall be accompanied by a written document setting forth the reason(s) why the Payment Application is not proper.

8.3.3 Verification of Work Completed. Upon receipt of a Payment Application, the Architect, Project Manager, if any and the District's Inspector shall inspect and verify the Work to determine whether it has been performed in accordance with requirements of the Contract Documents and to determine the portion of the Payment Application which is properly due to the Contractor under the terms of the Contract Documents.

8.3.4 District's Disbursement of Progress Payments.

8.3.4.1 Timely Disbursement of Progress Payments. Pursuant to Public Contract Code §20104.50, within thirty (30) days after the District's receipt of a proper Payment Application, there shall be paid, by District, to Contractor a sum equal to ninety-five percent (95%) of the value of the Work indicated in the Payment Application which is actually in place as of the date of the Payment Application, as verified by the District's Inspector, Project Manager, if any, and the Architect and the pro rata portion of the Contractor's overhead, supervision and general conditions costs and profit for that month; provided, however, that the District's obligation to disburse any Progress Payment shall be subject to the District's receipt of all documents set forth in Article 8.3.2 above, each and all of which are conditions precedent to the District's obligation to disburse Progress Payments. If a Payment Application is determined not to be proper due to the failure or refusal of the Contractor to submit documents with the Payment Application, as required by Article 8.3.2, or incompleteness or inaccuracies in any such documents submitted or if it is reasonably determined that the Record Drawings have not been continuously maintained to reflect the actual as built conditions of the Work completed in the period for which the Progress Payment is requested, the thirty (30) day period hereunder for the District's timely disbursement of a Progress Payment is deemed to commence on the date that the District is actually in receipt of documents not submitted with the Payment Application, or corrections to documents with the Payment Application so as to render them complete and accurate, or the date upon which the Contractor accurately and fully completes preparation of the Record Drawings relating to the Work for which the Progress Payment is requested.

8.3.4.2 Untimely Disbursement of Progress Payments. Pursuant to Public Contract Code §20104.50, if the District fails to make a Progress Payment within thirty (30) days after receipt of an undisputed and proper Payment Application, the District shall pay the Contractor interest on the undisputed amount of such Payment Application at the legal rate of interest set forth in California Code of Civil Procedure §685.010(a). The foregoing notwithstanding, if the District determines that any Payment Application is not proper, pursuant to Article 8.3.2 above, and the District does not return such Payment Application within the seven (7) day period provided for in Article 8.3.2, the period of time for the District's disbursement of the Progress Payment on such Payment Application without incurring interest liability shall be reduced by the number of days exceeding the seven (7) day return period.

8.3.4.3 District's Right to Disburse Payments by Joint Checks. The District, may, in its sole discretion, issue joint checks to the Contractor and Subcontractors/Material Suppliers in satisfaction of its obligation to make Progress Payments or the Final Payment due hereunder.

8.3.4.4 No Waiver of Defective or Non-Conforming Work. The approval of any Payment Application or the disbursement of any Progress Payment to the Contractor shall not be deemed nor constitute acceptance of defective or non-conforming Work.

8.3.5 Progress Payments for Changed Work. The Contractor's Payment Applications may

include requests for payment on account of Changes in the Work which have been properly authorized and approved by the District's Inspector, the Architect and all other governmental agencies with jurisdiction over such Change in accordance with the terms of the Contract Documents and for which a Change Order has been issued. Except as provided for herein, no other payment shall be made by the District for Changes in the Work.

8.3.6 Materials or Equipment Not Incorporated Into the Work.

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

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

8.3.6.3 Materials or Equipment Not Delivered or Stored at the Site. No payments shall be made by the District for materials or equipment to be incorporated into the Work where such materials or equipment have not been delivered or stored at the Site or which are in the process of fabrication or transportation to the Site.

8.3.7 Exclusions From Progress Payments. In addition to the District's right to withhold disbursement of any Progress Payment provided for in the Contract Documents, neither the Contractor's Payment Application shall include, nor shall the District be obligated to disburse any portion of the Contract Price for amounts which the Contractor does not intend to pay any Subcontractor or Material Supplier because of a dispute or any other reason.

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

8.3.9 Substitute Security for Retention. Pursuant to California Public Contract Code §22300, eligible and equivalent securities may be substituted for any monies withheld by the District to ensure the Contractor's performance under the Contract Documents at the request and expense of the Contractor and in conformity with the provisions of California Public Contract Code

§22300. The foregoing and the provisions of California Public Contract Code §22300 notwithstanding, failure of the Contractor to request the substitution of eligible and equivalent securities for monies to be withheld by the District within ten (10) days following the date of award of the Contract to Contractor shall be deemed a waiver of such right.

8.4 Final Payment.

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

8.4.2 Conditions Precedent to Disbursement of Final Payment. Neither Final Payment nor any remaining Contract Price shall become due until the Contractor submits to the District each and all of the following, the submittal of which are conditions precedent to the District's obligation to disburse the Final Payment: (i) an affidavit or certification by the Contractor that payrolls, bills for materials and other indebtedness incurred in connection with the Work for which the District or the District's property may or might be responsible or encumbered have been paid or otherwise satisfied; (ii) a certificate evidencing that insurance required by the Contract Documents to remain in force after the Contractor's receipt of Final Payment is currently in effect; (iii) a written statement that the Contractor knows of no One Hundred Percent reason that the insurance will not be renewable to cover any period following Final Payment as required by the Contract Documents; (iv) consent of the Surety on the Labor and Material Payment Bond and Performance Bond, to Final Payment if required; (v) duly completed and executed forms of Conditional or Unconditional Waivers and Releases of rights upon Final Payment of the Contractor, Subcontractors/Material Suppliers in accordance with California Civil Code §§8136 or 8138, with each of the same stating that there are, or will be, no claims for additional compensation after disbursement of the Final Payment; (vi) Operations and Maintenance manuals and separate warranties provided by any manufacturer or distributor of any materials or equipment incorporated into the Work; (vii) the Record Drawings; (viii) the form of Guarantee included in the Contract Documents duly executed by an authorized representative of the Contractor; (ix) any and all other items or documents required by the Contract Documents to be delivered to the District upon completion of the Work; (x) the completion and submittal of all reports required by the Contract Documents, including without limitation, verified reports required by applicable provisions of the California Code of Regulations; and (xi) if required by the District, such other data establishing payment or satisfaction of obligations such as receipts, releases and waivers of liens, Stop Payment Notices, claims, security interest or encumbrances arising out of the Contract to the extent and in such form as may be required by the District.

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

Article 4.21.1 above, the Final Payment due the Contractor shall be reduced in accordance with Article 4.21.2 above.

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

8.4.5 Claims Asserted After Final Payment. Any lien, Stop Payment Notice or other claim filed or asserted after the Contractor's acceptance of the Final Payment by any Subcontractor, laborer, Material Supplier or others in connection with or for Work performed under the Contract Documents shall be the sole and exclusive responsibility of the Contractor and the Surety. The Contractor and Surety shall indemnify, defend and hold harmless the District and its officers, agents, representatives and employees from and against any claims, demands or judgments arising or associated therewith, including without limitation attorney's fees incurred by the District in connection therewith.

8.5 Withholding of Payments. The District may withhold any Progress Payment or the Final Payment, in whole or in part, or backcharge the Contractor to the extent it may deem advisable to protect the District on account of: (i) defective Work or Work not in conformity with the requirements of the Contract Documents which is not remedied; (ii) failure of the Contractor to make payments when due Subcontractors/Material Suppliers; (iii) claims filed or reasonable evidence of the probable filing of claims by Subcontractors, laborers, Material Suppliers, or others performing any portion of the Work under the Contract Documents for which the District may be liable or responsible including, without limitation, Stop Payment Notice Claims filed with the District pursuant to California Civil Code §9350 et seq.; (iv) a reasonable doubt that the Contract can be completed for the then unpaid balance of the Contract Price; (v) tax demands filed in accordance with California Government Code §12419.4; (vi) other claims, penalties and/or forfeitures for which the District is required or authorized to retain funds otherwise due the Contractor; (vii) any amounts due from the Contractor to the District under the terms of the Contract Documents; or (viii) the Contractor's failure to perform any of its obligations under the Contract Documents, its default under the Contract Documents or its failure to maintain adequate progress of the Work. In addition to the foregoing, the District shall not be obligated to process any Payment Application or Application for Final Payment, nor shall Contractor be entitled to any Progress Payment or Final Payment so long as any lawful or proper direction concerning the Work or the performance thereof or any portion thereof, given by the District, the District's Inspector, the Architect or any public authority having jurisdiction over the Work, or any portion thereof, shall not be fully and completely complied with by the Contractor. When the District is reasonably satisfied that the Contractor has remedied any such deficiency, payment shall be made of the amount withheld.

8.6 Payments to Subcontractors. The Contractor shall pay all Subcontractors for and on account of Work of the Contract performed by such Subcontractors in accordance with the terms of their respective subcontracts and as provided for pursuant to California Public Contract Code §10262, the provisions of which are deemed incorporated herein by this reference. If the Contractor fails to make payment to Subcontractors in conformity with California Public Contract Code §10262, the provisions of California Public Contract Code §10253 shall apply; by this reference, the provisions of California Public Contract Code §10253 are incorporated herein in its entirety, except that the references in said Section 10253 to "the director" shall be deemed to refer to the District. The Contractor shall timely make payment of retention due Subcontractors in accordance with Public Contract Code §7107.

8.7 Computerized Job Cost Reporting System.

8.7.1 Job Cost Reporting. The Contractor and each Subcontractor with a Subcontract valued at One Million Five Hundred Thousand Dollars (\$1.5M) or greater shall maintain a computerized job cost reporting system conforming to the requirements set forth herein. The computer program(s) utilized by the Contractor and applicable Subcontractors shall be subject to the review and acceptance by the District. The job cost reporting systems for the Work shall be updated in regular intervals of not more than one (1) calendar month.

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

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

ARTICLE 9: CHANGES

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

9.2 Construction Change Directive. A Construction Change Directive is a written instrument issued by or on behalf of the District directing a Change to the Work prior to the Contractor and District reaching full agreement on an adjustment of the Contract Time and/or Contract Price on account of such Change. The Contractor shall promptly commence and diligently complete any Change to the Work subject to a Construction Change Directive issued hereunder. The issuance of a Change Order pursuant to this Article 9 in connection with any Construction Change Directive authorized by the District is not a condition precedent to Contractor's obligation to promptly commence and diligently complete any such Construction Change Directive. Upon completion of the Work subject to a Construction Change Directive, if the Contractor and District have not agreed on the

adjustment of Contract Time and/or Contract Price for such Change, District shall issue a Unilateral Change Order pursuant to this Article 9.

- 9.3 Oral Order of Change in the Work. Any oral order, direction, instruction, interpretation, or determination from the District or the Architect which in the opinion of the Contractor constitutes a Change to the Work, or otherwise requires an adjustment to the Contract Price or the Contract Time, shall be treated as a Change only if the Contractor gives the Architect, Project Manager, if any and the District's Inspector written notice within ten (10) days of the order, directions, instructions, interpretation or determination and prior to acting in accordance therewith. Time is of the essence in Contractor's written notice pursuant to the preceding sentence. Accordingly, Contractor acknowledges that its failure, for any reason, to give written notice within ten (10) days of such order, direction, instruction, interpretation or determination is the Contractor's waiver of any right to assert or claim any entitlement to an adjustment of the Contract Time or the Contract Price on account of such order, direction, instruction, interpretation or determination. The written notice shall state the date, circumstances, extent of adjustment to the Contract Price or the Contract Time, if any, requested, and the source of the order, directions, instructions, interpretation or determination that the Contractor regards as a Change. Unless the Contractor acts in strict accordance with this procedure, any such order, direction, instruction, interpretation or determination shall not be treated as a Change and the Contractor waives any claim for any adjustment to the Contract Price or the Contract Time on account thereof.
- 9.4 Contractor Submittal of Data. Within thirty (30) days after receipt of a written order directing a Change in the Work or furnishing the written notice regarding any oral order directing a Change in the Work, the Contractor shall submit to the Architect, Project Manager, if any, the District's Inspector and the District a detailed written statement setting forth the general nature of the Change, the adjustment to the Contract Price on account thereof, properly itemized and supported by sufficient substantiating data to permit evaluation of the same, and the extent of adjustment of the Contract Time, if any, required by such Change. No claim or adjustment to the Contract Price or the Contract Time shall be allowed if not asserted by the Contractor in strict conformity herewith or if asserted after Final Payment is made under the Contract Documents.
- 9.5 Adjustment to Contract Price and Contract Time on Account of Changes to the Work.
- 9.5.1 Adjustment to Contract Price. Adjustments to the Contract Price due to Changes in the Work shall be determined by application of one of the following methods, in the following order of priority:
- 9.5.1.1 Mutual Agreement. By negotiation and mutual agreement, on a lump sum basis, between the District and the Contractor on the basis of the estimate of the actual and direct increase or decrease in costs on account of the Change. Upon request of the District, Project Manager, if any, or the Architect, the Contractor shall provide a detailed estimate of increase or decrease in costs directly associated with performance of the Change along with cost breakdowns of the components of the Change and supporting data and documentation. The Contractor's estimate of increase or decrease in costs pursuant to the foregoing, if requested, shall be in sufficient detail and in such form as to allow the District, the District's Inspector and the Architect to review and assess the completeness and accuracy thereof. The Contractor shall be solely responsible for any additional costs or additional time arising out of, or related in any manner to, its failure to provide the estimate of costs within the time specified in the request of the District or the Architect for such estimate.
- 9.5.1.2 Determination by the District. By the District, whether or not negotiations are initiated pursuant to Article 9.5.1.1 above, based upon actual and necessary costs incurred by the Contractor as determined by the District on the basis of the Contractor's records. In the event that the procedure set forth in this Article 9.5.1.2 is utilized to determine the extent of adjustment to the Contract Price on account of Changes to the

Work, promptly upon determining the extent of adjustment to the Contract Price, the District shall notify the Contractor in writing of the same; the Contractor is deemed to have accepted the District's determination of the amount of adjustment to the Contract Price on account of a Change to the Work unless Contractor notifies the District, the Architect, Project Manager, if any and the District's Inspector, in writing, not more than fifteen (15) days from the date of the District's written notice, of any objection to the District's determination. Failure of the Contractor to timely notify the District, the Architect and the District's Inspector of Contractor's objections to the District's determination of the extent of adjustment to the Contract Price shall be deemed Contractor's acceptance of the District's determination and a waiver of any right or basis of the Contractor to thereafter protest or otherwise object to the District's determination. Notwithstanding any objection of the Contractor to the District's determination of the extent of any adjustment to the Contract Price pursuant to this Article 9.5.1.2, Contractor shall, pursuant to Article 9.8 below, diligently proceed to perform and complete any such Change.

9.5.1.3 Basis for Adjustment of Contract Price. If Changes in the Work require an adjustment of the Contract Price pursuant to Articles 9.5.1.1 or 9.5.1.2 above, the basis for adjustment of the Contract Price shall be as follows:

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

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

event the Contractor shall not be compensated for the costs of furnishing such materials and/or equipment or any mark-up thereon.

9.5.1.3.3 Construction Equipment. Contractor shall be compensated for the actual cost of the necessary and direct use of Construction Equipment in the performance of Changes to the Work. Use of such Construction Equipment in the performance of Changes to the Work shall be compensated in increments of fifteen (15) minutes. Rental time for Construction Equipment moved by its own power shall include time required to move such Construction Equipment to the site of the Work from the nearest available rental source of the same. If Construction Equipment is not moved to the Site by its own power, Contractor will be compensated for the loading and transportation costs in lieu of rental time. The foregoing notwithstanding, neither moving time or loading and transportation time shall be allowed if the Construction Equipment is used for performance of any portion of the Work other than Changes to the Work. Unless prior approval in writing is obtained by the Contractor from the Architect, Project Manager, if any, the District's Inspector and the District, no costs or compensation shall be allowed for time while Construction Equipment is inoperative, idle or on standby, for any reason. The Contractor shall not be entitled to an allowance or any other compensation for Construction Equipment or tools used in the performance of Changes to the Work where such Construction Equipment or tools have a replacement value of \$500.00 or less. Construction Equipment costs claimed by the Contractor in connection with the performance of any Change to the Work shall not exceed rental rates established by distributors or construction equipment rental agencies in the locality of the Site; any costs asserted which exceed such rental rates shall not be allowed or paid. Unless otherwise specifically approved in writing by the Architect, Project Manager, if any, the District's Inspector and the District, the allowable rate for the use of Construction Equipment in connection with Changes to the Work shall constitute full compensation to the Contractor for the cost of rental, fuel, power, oil, lubrication, supplies, necessary attachments, repairs or maintenance of any kind, depreciation, storage, insurance, labor (exclusive of labor costs of the Construction Equipment operator), and any all other costs incurred by the Contractor incidental to the use of such Construction Equipment.

9.5.1.3.4 Mark-up on Costs of Changes to the Work. In determining the cost to the District and the extent of increase to the Contract Price resulting from a Change adding to the Work, the allowance for mark-ups on the costs of the Change for all overhead (including home office and field overhead), general conditions costs and profit associated with the Change shall not exceed the percentage set forth in the Special Conditions, regardless of the number of Subcontractors, of any tier, performing any portion of any Change to the Work. If a Change to the Work reduces the Contract Price, no profit, general conditions or overhead costs shall be paid by the District to the Contractor for the reduced or deleted Work. In such event, the adjustment to the Contract Price shall be the actual cost reduction realized by the reduced or deleted Work multiplied by the percentage set forth in the Special Conditions for mark-ups on the cost of a Change adding to the scope of the Work.

9.5.1.4 Contractor Maintenance of Records. If the Contractor is directed to perform any ScChanges to the Work pursuant to Article 9.1, 9.2 or 9.3, or should the Contractor

encounter conditions which the Contractor believes to obligate the District to adjust the Contract Price and/or the Contract Time, Contractor shall maintain detailed records on a daily basis. Such records shall include without limitation hourly records for labor and Construction Equipment and itemized records of materials and equipment used that day in connection with the performance of any Change to the Work. If more than one Change to the Work is performed by the Contractor in a calendar day, Contractor shall maintain separate records of labor, Construction Equipment, materials and equipment for each such Change. If any Subcontractor provides or performs any portion of a Change to the Work, Contractor shall require that each such Subcontractor maintain records in accordance with this Article. Each daily record maintained hereunder shall be signed by Contractor's Superintendent or Contractor's authorized representative which shall constitute the Contractor's representation and warranty to the District that all information contained therein is true, accurate, complete and relate only to the Change referenced therein. All records maintained by a Subcontractor relating to the costs of a Change to the Work shall be signed by such Subcontractor's authorized representative or Superintendent. All records maintained hereunder shall be subject to inspection, review and/or reproduction by the District, the Architect, Project Manager, if any or the District's Inspector upon request. If the Contractor fails or refuses, for any reason, to maintain or make available for inspection, review and/or reproduction such records and the adjustment to the Contract Price on account of any Change to the Work, the District's reasonable good faith determination of the extent of adjustment to the Contract Price on account of such Change shall be final, conclusive, dispositive and binding upon Contractor. Contractor's obligation to maintain records hereunder is in addition to, and not in lieu of, any other Contractor obligation under the Contract Documents with respect to Changes to the Work.

9.5.2 Adjustment to Contract Time. If any Change to the Work authorized pursuant to this Article 9, the Contract Time affects the critical path of the Work, the Contract Time shall be extended or reduced by Change Order for a period of time commensurate with the time reasonably necessary to perform such Change. The Contractor is solely responsible for submitting scheduling data, analysis and other materials necessary or required by the District to substantiate the Contract Time adjustment requested by the Contractor for a Change. The District is not obligated to consider any adjustment to the Contract Time on account of a Change until the Contractor has submitted such scheduling data, analysis and other materials.

9.5.3 Addition or Deletion of Alternate Bid Item(s). If the Bid Proposal for the Work includes proposal(s) for Alternate Bid Item(s), during Contractor's performance of the Work, the District may elect, pursuant to this Article to add any such Alternate Bid Item(s) if the same did not form a basis for award of the Contract or delete any such Alternate Bid Item(s) if the same formed a basis for award of the Contract. If the District elects to add or delete any such Alternate Bid Item(s) pursuant to the foregoing, the cost or credit for such Alternate Bid Item(s) shall be as set forth in the Contractor's Bid. If any Alternate Bid Item is added or deleted from the Work pursuant to the foregoing, the Contract Time shall be adjusted by the number of days allocated for the added or deleted Alternate Bid Item in the Contract Documents; if days are not allocated for any Alternate Bid Item added or deleted pursuant to the foregoing, the Contract Time shall be equitably adjusted.

9.6 Change Orders. If the District approves of a Change, a written Change Order prepared by the Architect on behalf of the District shall be forwarded to the Contractor describing the Change and setting forth the adjustment to the Contract Time and the Contract Price, if any, on account of such Change. All Change Orders shall be in full payment and final settlement of all claims for direct, indirect and consequential costs, including without limitation, costs of delays or impacts related to, or arising out of, items covered and affected by the Change Order, as well as any adjustments to the Contract Time. Any claim or item relating to any Change incorporated into a Change Order not

presented by the Contractor for inclusion in the Change Order shall be deemed waived. The Contractor shall execute the Change Order prepared pursuant to the foregoing; once the Change Order has been prepared and forwarded to the Contractor for execution, without the prior approval of the District which may be granted or withheld in the sole and exclusive discretion of the District, the Contractor shall not modify or amend the form or content of such Change Order, or any portion thereof. The Contractor's attempted or purported modification or amendment of any such Change Order, without the prior approval of the District, shall not be binding upon the District; any such unapproved modification or amendment to such Change Order shall be null, void and unenforceable. Unless otherwise expressly provided for in the Contract Documents or in the Change Order, any Change Order issued hereunder shall be binding upon the District only upon action of the District's Board of Trustees approving and ratifying such Change Order. In the event of any amendment or modification made by the Contractor to a Change Order for which there is no prior approval by the District, in accordance with the provisions of this Article 9.6, unless otherwise expressly stated in its approval and ratification of such Change Order, any action of the Board of Trustees to approve and ratify such Change Order shall be deemed to be limited to the Change Order as prepared by the Architect; such approval and ratification of such Change Order shall not be deemed the District's approval and ratification of any unapproved amendment or modification by the Contractor to such Change Order.

- 9.7 Contractor Notice of Changes. If the Contractor claims that any instruction, request, the Drawings, the Specifications, action, condition, omission, default, or other situation obligates the District to increase the Contract Price or to extend the Contract Time, the Contractor shall notify the Project Manager, if any, the District's Inspector and the Architect, in writing, of such claim within ten (10) days from the date of its actual or constructive notice of the factual basis supporting the same. The District shall consider any such claim of the Contractor only if sufficient supporting documentation is submitted with the Contractor's notice to the District's Inspector and the Architect. Time is of the essence in Contractor's written notice pursuant to the preceding sentence so that the District can promptly investigate and consider alternative measures to the address such instruction, request, Drawings, Specifications, action, condition, omission, default or other situation. Accordingly, Contractor acknowledges that its failure, for any reason, to give written notice (with sufficient supporting documentation to permit the District's review and evaluation) within ten (10) days of its actual or constructive knowledge of any instruction, request, Drawings, Specifications, action, condition, omission, default or other situation for which the Contractor believes there should an adjustment of the Contract Time or the Contract Price shall be deemed Contractor's waiver, release, discharge and relinquishment of any right to assert or claim any entitlement to an adjustment of the Contract Time or the Contract Price on account of any such instruction, request, Drawings, Specifications, action, condition, omission, default or other situation. In the event that the District determines that the Contract Price or the Contract Time are subject to adjustment based upon the events, circumstances and supporting documentation submitted with the Contractor's written notice under this Article 9.7, any such adjustment shall be determined in accordance with the provisions of Articles 9.5.1 and 9.5.2.
- 9.8 Disputed Changes. If there is any dispute or disagreement between the Contractor and the District or the Architect regarding the characterization of any item as a Change to the Work or as to the appropriate adjustment of the Contract Price or the Contract Time on account thereof, the Contractor shall promptly proceed with the performance of such item of the Work, subject to a subsequent resolution of such dispute or disagreement in accordance with the terms of the Contract Documents. The Contractor's failure or refusal to so proceed with such Work may be deemed to be Contractor's default of a material obligation of the Contractor under the Contract Documents.
- 9.9 Emergencies. In an emergency affecting or threatening the safety of persons, or which affects or threatens the Work, or property, the Contractor, without special instruction or prior authorization from the District, Project Manager or the Architect, is permitted to act at its discretion to prevent

such threatened loss or injury. Any compensation claimed by the Contractor on account of such emergency work shall be submitted and determined in accordance with this Article 9.

- 9.10 Minor Changes in the Work. The Architect may order minor Changes in the Work not involving an adjustment in the Contract Price or the Contract Time and not inconsistent with the intent of the Contract Documents. Such Changes shall be effected by written order and shall be binding on the District and the Contractor. The Contractor shall carry out such orders promptly.
- 9.11 Unauthorized Changes. Any Work beyond the lines and grades shown on the Contract Documents, or any extra Work performed or provided by the Contractor without notice to the Architect and the District's Inspector in the manner and within the time set forth in Articles 9.2 or 9.7 shall be considered unauthorized and at the sole expense of the Contractor. Work so done will not be measured or paid for, no extension to the Contract Time will be granted on account thereof and any such Work may be ordered removed at the Contractor's sole cost and expense. The failure of the District to direct or order removal of such Work shall not constitute acceptance or approval of such Work nor relieve the Contractor from any liability on account thereof.

ARTICLE 10: SEPARATE CONTRACTORS

- 10.1 District's Right to Award Separate Contracts. The District reserves the right to perform construction or operations related to the Project with the District's own forces or to award separate contracts in connection with other portions of the Project or other construction or operations at or about the Site. If the Contractor claims that delay or additional cost is involved because of such action by the District, the Contractor shall seek an adjustment to the Contract Price or the Contract Time as provided for in the Contract Documents. Failure of the Contractor to request such an adjustment of the Contract Time or the Contract Price in strict conformity with the provisions of the Contract Documents applicable thereto shall be deemed a waiver of the same.
- 10.2 District's Coordination of Separate Contractors. The District shall provide for coordination of the activities of the District's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the District in reviewing their respective Construction Schedules when directed to do so. The Contractor shall make any revisions to the Approved Construction Schedule for the Work hereunder deemed necessary after a joint review and mutual agreement. The Construction Schedules shall then constitute the Construction Schedules to be used by the Contractor, separate contractors and the District until subsequently revised.
- 10.3 Mutual Responsibility. The Contractor shall afford the District and separate contractors of the District reasonable opportunity for storage of their materials and equipment and performance of their activities at the Site and shall connect and coordinate the Contractor's Work, construction and operations with theirs as required by the Contract Documents.
- 10.4 Discrepancies or Defects. If part of the Contractor's Work depends for proper execution or results upon construction or operations by the District or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect, Project Manager, if any and the District's Inspector any apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acknowledgment that the District's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then discoverable by the Contractor's reasonable diligence.

ARTICLE 11: TESTS AND INSPECTIONS

- 11.1 Tests; Inspections; Observations.
- 11.1.1 Contractor's Notice. If the Contract Documents, the Laws or any public authority with jurisdiction over the Work requires the Work, or any portion thereof, to be specially tested, inspected or approved, the Contractor shall give the Architect, the Project Manager and the

District's Inspector written notice of the readiness of such Work for observation, testing or inspection at least two (2) working days prior to the time for the conducting of such test, inspection or observation. The Contractor shall not cover up any portion of the Work subject to tests, inspections or observations prior to the completion and satisfaction of the requirements of such test, inspection or observation. If any portion of the Work subject to tests, inspection or approval is covered up by Contractor prior to completion and satisfaction of the requirements of such tests, inspection or approval, Contractor shall be responsible for the uncovering of such portion of the Work as is necessary for performing such tests, inspection or approval without adjustment of the Contract Price or the Contract Time on account thereof.

11.1.2 Cost of Tests and Inspections. The District will pay for fees, costs and expenses for the initial tests/inspections of materials/equipment which are conducted at the Site or locations within a one hundred (100) mile radius of the Site. All fees, costs or expenses for subsequent tests/inspections or for tests/inspections conducted at a location more than a one hundred (100) mile radius from the Site (including without limitation, travel and travel-related expenses) shall be borne solely and exclusively by the Contractor.

11.1.3 Testing/Inspection Laboratory. The District shall select duly qualified person(s) or testing laboratory(ies) to conduct the tests and inspections to be paid for by the District and required by the Contract Documents. All such tests and inspections shall be in conformity with the Laws, including without limitation, Title 24 of the California Code of Regulations. Where inspection or testing is to be conducted by an independent laboratory or testing agency, materials or samples thereof shall be selected by the laboratory, testing agency, the District's Inspector, the Project Manager or the Architect and not by the Contractor.

11.1.4 Additional Tests, Inspections and Approvals. If the Architect, the Project Manager, the District's Inspector or public authorities having jurisdiction over the Work determine that portions of the Work require additional testing, inspection or approval, the Architect or Project Manager, if any will, upon written authorization from the District, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the District, and the Contractor shall give timely notice to the Architect, the Project Manager and the District's Inspector of when and where tests and inspections are to be made so the District's Inspector and the Architect may observe such procedures. The District shall bear the costs of such additional tests, inspections or approvals, except to the extent that such additional tests, inspections or approvals reveal any failure of the Work to comply with the requirements of the Contract Documents, in which case the Contractor shall bear all costs made necessary by such failures, including without limitation, the costs of corrections, repeat tests, inspections or approvals and the fees of the Architect, Project Manager, if any, and the District's Inspector in connection therewith.

11.2 Delivery of Certificates. Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

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

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.1 Inspection of the Work

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

any other public or quasi-public authority with jurisdiction over the Work or any portion thereof.

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

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

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

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

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

12.6 Failure of Contractor to Correct Work. If the Contractor fails to commence to correct defective or non-conforming Work within three (3) days of notice of such condition and promptly thereafter complete the same within a reasonable time, the District may correct it in accordance with the Contract Documents. If the Contractor does not proceed with correction of such defective or non-conforming Work within the time fixed herein, the District may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage after written notice, the District may sell such materials or equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including without limitation compensation for the Architect's services, attorneys fees and other expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Price shall be reduced by the deficiency. If payments of the Contract Price then or thereafter due the Contractor

are not sufficient to cover such amount, the Contractor and the Surety shall be jointly and severally liable to the District for any such excess amount.

- 12.7 Acceptance of Defective or Non-Conforming Work. The District may, in its sole and exclusive discretion, elect to accept Work which is defective or which is not in accordance with the requirements of the Contract Documents, instead of requiring its removal and correction, in which case the Contract Price shall be reduced as appropriate and equitable. The District's determination of the extent of reduction of the Contract Price on account of defective or non-conforming Work accepted by the District shall be binding, conclusive, dispositive and not subject to appeal or other dispute resolution procedures, unless such determination is manifestly unreasonable.

ARTICLE 13: WARRANTIES

- 13.1 Workmanship and Materials. The Contractor warrants to the District that: (i) all materials and equipment furnished under the Contract Documents conform to requirements of the Contract Documents and are new, of good quality and of the most suitable grade and quality for the purpose intended, unless otherwise specified in the Contract Documents; and (ii) all Work and workmanship is of good quality, free from faults and defects and in conformity with the requirements of the Contract Documents. If required by the Architect or the District, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment incorporated into the Work. Any Work or portion thereof not conforming to these requirements, including substitutions or alternatives not properly approved in accordance with the Contract Documents may be deemed defective. Where there is an approved substitution of, or alternative to, material or equipment specified in the Contract Documents, the Contractor warrants to the District that such installation, construction, material, or equipment will equally perform the function and have the quality of the originally specified material or equipment. The Contractor expressly warrants the merchantability, the fitness for use, and quality of all substitute or alternative items in addition to any warranty given by the manufacturer or supplier of such item.
- 13.2 Warranty Work. If, within one (1) year after the date of Final Acceptance, or such other time frame set forth elsewhere in the Contract Documents, any of the Work is found to be defective or not in accordance with the requirements of the Contract Documents, or otherwise contrary to the warranties contained in the Contract Documents, the Contractor shall commence all necessary corrective action not more than seven (7) days after receipt of a written notice from the District to do so, and to thereafter diligently complete the same. In the event that Contractor shall fail or refuse to commence correction of any such item within said seven (7) day period or to diligently prosecute such corrective actions to completion, the District may, without further notice to Contractor, cause such corrective Work to be performed and completed. In such event, Contractor and Contractor's Performance Bond Surety shall be responsible for all costs in connection with such corrective Work, including without limitation, general administrative overhead costs of the District in securing and overseeing such corrective Work. Nothing contained herein shall be construed to establish a period of limitation with respect to any obligation of the Contractor under the Contract Documents. The obligations of the Contractor hereunder shall be in addition to, and not in lieu of, any other obligations imposed by any special guarantee or warranty required by the Contract Documents, guarantees or warranties provided by any manufacturer of any item or equipment forming a part of, or incorporated into the Work, or otherwise recognized, prescribed or imposed by law. Neither the District's Final Acceptance, the making of Final Payment, any provision in Contract Documents, nor the use or occupancy of the Work, in whole or in part, by District shall constitute acceptance of Work not in accordance with the Contract Documents nor relieve the Contractor or the Contractor's Performance Bond Surety from liability with respect to any warranties or responsibility for faulty or defective Work or materials, equipment and workmanship incorporated therein.
- 13.3 Guarantee. Upon completion of the Work, Contractor shall execute and deliver to the District the form of Guarantee included with the Contract Documents. The Contractor's execution and delivery

of the form of Guarantee is an express condition precedent to any obligation of the District to disburse the Final Payment to the Contractor.

- 13.4 Survival of Warranties; Surety Obligations. The Contractor's warranty obligations hereunder shall survive the Contractor's completion of Work under the Contract Documents, the District's Final Acceptance or the termination of the Contract. The obligations of the Surety issuing the Performance Bond shall include assumption and discharge of the Contractor's warranty obligations if the Contractor fails or refuses to perform its warranty obligations hereunder in strict conformity herewith.

ARTICLE 14: SUSPENSION OF WORK

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

ARTICLE 15: TERMINATION

15.1 Termination for Cause.

15.1.1 District's Right to Terminate. The District may terminate the Contract upon the occurrence of any one or more of the following events of the Contractor's default: (i) if the Contractor refuses or fails to prosecute the Work with diligence as will insure Completion of the Work within the Contract Time, or if the Contractor fails to One Hundred Percent Complete the Work within the Contract Time; (ii) if the Contractor becomes bankrupt or insolvent, or makes a general assignment for the benefit of creditors, or if the Contractor or a third party files a petition to reorganize or for protection under any bankruptcy or similar laws, or if a trustee or receiver is appointed for the Contractor or for any of the Contractor's property on account of the Contractor's insolvency, and the Contractor or its successor in interest does not provide adequate assurance of future performance in accordance with the Contract Documents within ten (10) days of receipt of a request for such assurance from the District; (iii) if the Contractor repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment; (iv) if the Contractor repeatedly fails to make prompt payments to any Subcontractor, of any tier, or Material Suppliers or others for labor, materials or equipment; (v) if the Contractor disregards laws, ordinances, rules, codes, regulations, orders applicable to the Work or similar requirements of any public entity having jurisdiction over the Work; (iv) if the Contractor disregards proper directives of the Architect, the District's Inspector or District under the Contract Documents; (vii) if the Contractor performs Work which deviates from the Contract Documents and neglects or refuses to correct such Work; or (viii) if the Contractor otherwise violates in any material way any provisions or requirements of the

Contract Documents. Once the District determines that sufficient cause exists to justify the action, the District may terminate the Contract without prejudice to any other right or remedy the District may have, after giving the Contractor and the Surety at least seven (7) days advance written notice of the effective date of termination. The District shall have the sole discretion to permit the Contractor to remedy the cause for the termination without waiving the District's right to terminate the Contract, or otherwise waiving, restricting or limiting any other right or remedy of the District under the Contract Documents or at law.

15.1.2 District's Rights Upon Termination. If the Contract is terminated pursuant to this Article 15.1, the District may take over the Work and prosecute it to completion, by contract or otherwise, and may exclude the Contractor from the site. The District may take possession of the Work and of all of the Contractor's tools, appliances, construction equipment, machinery, materials, and plant which may be on or about the Site, and use the same to the full extent they could be used by the Contractor without liability to the Contractor. In exercising the District's right to prosecute the completion of the Work, the District may also take possession of all materials and equipment at or about the Site or for which the District has paid the Contractor but which are stored elsewhere, and finish the Work as the District deems expedient. In exercising the District's right to prosecute the completion of the Work, the District shall have the right to exercise its sole discretion as to the manner, methods, and reasonableness of the costs of completing the Work and the District shall not be required to obtain the lowest price for completion of the Work. If the District takes bids for remedial Work or completion of the Work, the Contractor shall not be eligible for the award of such contract(s).

15.1.3 Completion by the Surety. If the Contract is terminated pursuant to this Article 15.1, the District may demand that the Surety take over and complete the Work. The District may require that in so doing, the Surety not utilize the Contractor in performing and completing the Work. Upon the failure or refusal of the Surety to take over and begin completion of the Work within twenty (20) days after demand therefor, the District may take over the Work and prosecute it to completion as provided for above.

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

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

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

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

the District and the Contractor shall be determined in accordance with Article 15.2 hereof.

15.1.8 District's Rights Cumulative. In the event the Contract is terminated pursuant to this Article 15.1, the termination shall not affect or limit any rights or remedies of the District against the Contractor or the Surety. The rights and remedies of the District under this Article 15.1 are in addition to, and not in lieu of, any other rights and remedies provided by the Laws or under the Contract Documents. Any retention or payment of monies to the Contractor by the District shall not be deemed to release the Contractor or the Surety from any liability hereunder.

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

ARTICLE 16: MISCELLANEOUS

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

16.2 Marginal Headings; Interpretation. The titles of the various Articles of these General Conditions and elsewhere in the Contract Documents are used for convenience of reference only and are not intended to, and shall in no way, enlarge or diminish the rights or obligations of the District or the Contractor and shall have no effect upon the construction or interpretation of the Contract Documents. The Contract Documents shall be construed as a whole in accordance with their fair meaning and not strictly for or against the District or the Contractor.

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

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

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

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

16.7 Gender and Number. Whenever the context of the Contract Documents so require, the neuter gender shall include the feminine and masculine, the masculine gender shall include the feminine and neuter, the singular number shall include the plural and the plural number shall include the singular.

16.8 Independent Contractor Status. In performing its obligations under the Contract Documents, the Contractor is an independent contractor to the District and not an agent or employee of the District.

16.9 Notices. Except as otherwise expressly provided for in the Contract Documents, all notices which the District or the Contractor may be required, or may desire, to serve on the other, shall be effective only if delivered by personal delivery or by postage prepaid, First Class Certified Return Receipt Requested United States Mail, addressed to the District or the Contractor at their respective address set forth in the Contract Documents, or such other address(es) as either the District or the Contractor may designate from time to time by written notice to the other in conformity with the provisions hereof. In the event of personal delivery, such notices shall be deemed effective upon delivery, provided that such personal delivery requires a signed receipt by the recipient acknowledging delivery of the same. In the event of mailed notices, such notice shall be deemed effective on the third working day after deposit in the mail.

16.10 Disputes; Continuation of Work. Notwithstanding any claim, dispute or other disagreement between the District and the Contractor regarding performance under the Contract Documents, the scope of Work thereunder, or any other matter arising out of or related to, in any manner, the Contract Documents, the Contractor shall proceed diligently with performance of the Work in accordance with the District's written direction, pending any final determination or decision regarding any such claim, dispute or disagreement.

16.11 Dispute/Claims Resolution.

16.11.1 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.

16.11.1.1 Claim Defined. The term "Claim" shall be as defined in Section 9204.

16.11.1.2 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.

16.11.1.3 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.

16.11.1.4 Meet and Confer.

16.11.1.4.1 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.

16.11.1.4.2 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.

16.11.1.5 Non-Binding Mediation.

16.11.1.5.1 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.

16.11.1.5.2 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.

16.11.1.5.3 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.

16.11.1.5.4 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.

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

16.11.1.5.6 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.

16.11.2 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.

16.11.3 Subcontractor Claims.

16.11.3.1 Subcontractor Claim Submittal. If a Subcontractor, of any tier (collectively "Subcontractor") 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.

16.11.3.2 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.

16.11.3.3 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.

16.11.3.4 Disputed Subcontractor Claims. Subcontractor Claims which are not fully resolved by the Section 9204 non-binding dispute resolution procedures shall be resolved by 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.

16.11.4 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.

16.11.5 Section 20104.4 Dispute Resolution Procedures; Claims Less Than \$375,000. Any Claim, or portion thereof, in dispute after completion of the Section 9204 non-binding dispute resolution procedures and the Government Code Claims Process which is equal to or less \$375,000 shall be resolved in accordance with the civil action procedures established in Public Contract Code §20104.4. Unless otherwise agreed to by the District and the Contractor in writing, the mediation conducted pursuant to Section 9204 procedures shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

16.11.5.1 Binding Arbitration of Claims Exceeding \$375,000.

16.11.5.1.1 JAMS Arbitration. Any Claim, or portion thereof in dispute after completion of the Section 9204 procedures and the Government Code Claims Process which exceeds \$375,000 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. The locale for any arbitration commenced hereunder shall be the regional office of the JAMS closest to the Site.

- 16.11.5.2 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. 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 Contractor, except to the extent that such joinder would unduly delay or complicate the expeditious resolution of the claim, dispute or other disagreement between the District and the Contractor, in which case an appropriate severance order shall be issued by the Arbitrator(s).
- 16.11.5.3 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.
- 16.11.5.4 Arbitration Award. The award rendered by the Arbitrator(s) ("Arbitration Award") shall be final and binding upon the District and the Contractor only if the Arbitration Award is: (i) supported by One Hundred Percent evidence; (ii) based on applicable legal standards in effect that 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 either 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.
- 16.11.5.5 Arbitration Fees and Expenses. The expenses and fees of the Arbitrator(s) shall be divided equally among all of the parties to the arbitration. Each party to any arbitration commenced hereunder 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(s) may award arbitration costs, including Arbitrators' 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."
- 16.11.5.6 Limitation on Arbitrator. The Superior Court for the State of California for

the County in which the Project Site is situated has the sole and exclusive jurisdiction, and an arbitrator has no authority, to hear and/or determine a challenge to the commencement or maintenance of an arbitration proceeding on the grounds that: (i) the subject matter of the arbitration proceeding is barred by the applicable statute of limitations; (ii) the subject matter of the arbitration proceeding is barred by a provision of the California Government Claims Act; (iii) the subject matter of the arbitration proceeding is outside the scope of the arbitration clause; (iv) the Contractor has failed to satisfy all conditions precedent to commencement or maintenance of an arbitration proceeding; (v) waiver of the right to compel arbitration; (vi) grounds exist for the revocation of the arbitration agreement; and/or, (vii) there is the prospect that a ruling in arbitration would conflict or potentially with a ruling in a pending proceeding regarding the Project on a common issue of law or fact.

16.11.6 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.

- 16.12 Limitation on Special/Consequential Damages. In the event of the District's breach or default of its obligations under the Contract Documents, the damages, if any, recoverable by the Contractor shall be limited to general damages which are directly caused by the breach or default of the District and shall exclude any and all special or consequential damages, if any. The Contractor expressly acknowledges the foregoing limitation to recovery of only general damages from the District if the District is in breach or default of its obligations under the Contract Documents; the Contractor expressly waives and relinquishes any recovery of special or consequential damages from the District.
- 16.13 Capitalized Terms. Except as otherwise expressly provided, capitalized terms used in the Contract Documents shall have the meaning and definition for such term as set forth in the Contract Documents.
- 16.14 Attorneys' Fees. Except as expressly provided for in the Contract Documents, or authorized by law, neither the District nor the Contractor shall recover from the other any attorney's fees or other costs associated with or arising out of any legal, administrative or other proceedings filed or instituted in connection with or arising out of the Contract Documents or the performance of either the District or the Contractor thereunder.
- 16.15 Provisions Required by Law Deemed Inserted. Each and every provision of law and clause required by law to be inserted in the Contract Documents is deemed to be inserted herein and the Contract Documents shall be read and enforced as though such provision or clause are included herein, and if through mistake, or otherwise, any such provision or clause is not inserted or if not correctly inserted, then upon application of either party, the Contract Documents shall forthwith be physically amended to make such insertion or correction.
- 16.16 Days. Unless otherwise expressly stated, references to "days" in the Contract Documents shall be deemed to be calendar days.
- 16.17 Entire Agreement. The Contract Documents contain the entire agreement and understanding between the District and the Contractor concerning the subject matter hereof, and supersedes and replaces all prior negotiations, proposed agreements or amendments, whether written or oral. No amendment or modification to any provision of the Contract Documents shall be effective or enforceable except by an agreement in writing executed by the District and the Contractor.

[END OF SECTION]

SPECIAL CONDITIONS

Application of Special Conditions. These Special Conditions for a part of the Contract Documents for the Work described as **BID # 2024-09 LOS BANOS PLANT SCIENCE MODULAR**

1. .
2. Project Manager. The District will manage the project.
3. Drawings and Specifications. (Available Electronically), The number of sets of the Drawings and Specifications which the District will provide to the Contractor, pursuant to Article 2.1.3 of the General Conditions is **Two (2)** Additional sets of the Drawings and Specifications may be obtained by the Contractor from the District at the cost of reproduction.
4. Insurance Coverages.
 - 4.1. Contractor Insurance. Pursuant to Article 6 of the General Conditions, the Contractor shall obtain and maintain the following insurance coverages with minimum coverage amounts as set forth below:

Policy of Insurance	Minimum Coverage Amount
Commercial General Liability Insurance	Per Occurrence: Two Million Dollars (\$2,000,000)
	Aggregate: Four Million Dollars (\$4,000,000)
Workers Compensation	In accordance with the Laws
Employers Liability	One Million Dollars (\$1,000,000)
Builders Risk	Full insurable value of the Work; Seismic coverage: Required

- 4.2. Subcontractor Insurance. Pursuant to Article 6 of the General Conditions, each Subcontractor shall obtain and maintain the following insurance coverages with minimum coverage amounts as set forth below

Policy of Insurance	Minimum Coverage Amount
Commercial General Liability Insurance	Per Occurrence: One Million Dollars (\$1,000,000)
	Aggregate: Two Million Dollars (\$2,000,000)
Workers Compensation	In accordance with the Laws
Employers Liability	One Million Dollars (\$1,000,000)

5. Contract Time. The commencement date of the Contract Time of the Work shall be as set forth in the Notice to Proceed issued by or on behalf of the District. The Contractor shall achieve One Hundred Percent (100%) of the Work 120 days from Notice to Proceed. The Contract Time shall not be extended if the Contractor commences Work after the date established in the Notice to Proceed for commencement of Work without fault or neglect of the District.
6. Liquidated Damages. The per diem rate of Liquidated Damages for delayed One Hundred Percent Completion, delayed submission of Submittals and delayed completion of Punchlist shall be as set forth herein.
 - 6.1. Delayed One Hundred Percent Completion. If Completion is not achieved on or before expiration of the Contract Time, the Contractor shall be liable to the District for Liquidated Damages from the date of expiration of the Contract Time to the date that the Contractor achieves Completion of the Work at the per diem rate of Five Hundred (\$500.00).

- 6.2. Delayed Submission of Submittals. If the Contractor fails to submit a Submittal in accordance with the Submittal Schedule, the Contractor shall be liable to the District for Liquidated Damages for each delayed Submittal at the per diem rate of Five Hundred Dollars (\$500.00) from the date that such Submittal was due to be submitted pursuant to the Submittal Schedule and the date that the Contractor actually submits the Submittal to the Architect.
- 6.3. Delayed Punchlist Completion. If the Contractor fails to complete Punchlist within the time established pursuant to the Contract Documents, the Contractor shall be liable to the District for Liquidated Damages from the date established for completion of Punchlist until the date that all Punchlist is actually completed at the per diem rate of Five Hundred Dollars (\$500.00).
- 6.4. Surety Liability. Subject only to limitations established by the penal sum of the Performance Bond, the Surety issuing the Performance Bond shall be liable to the District for Liquidated Damages due from the Contractor.
7. Mark-Ups on Changes to the Work. In the event of Changes to the Work, pursuant to Article 9 of the General Conditions, the mark-up for all overhead (including home and field office overhead), general conditions costs and profit, shall not exceed the percentage of allowable direct actual costs for performance of the Change as set forth below.
- 7.1. Subcontractor Performed Changes. For the portion of any Change performed by Subcontractors of any tier, the percentage mark-up on allowable actual direct labor and materials costs incurred by all Subcontractors of any tier shall be **Ten Percent (10%)**. In addition, for the portion of any Change performed by a Subcontractor of any tier, the Contractor may add an amount equal to Four Percent (4%) of the allowable actual direct labor and materials costs of Subcontractors performing the Change; the foregoing mark-up shall not be applied to the Subcontractor mark-up.
- 7.2. Contractor Performed Changes. For the portion of any Change performed by the Contractor's own forces, the mark-up on the allowable actual direct labor and materials costs of such portion of a Change shall be **Ten Percent (10%)**.
- 7.3. Bond Premium Costs. In addition to the foregoing mark-ups on the direct costs of labor and materials, a bond premium expense in an amount equal to the lesser of the Contractor's actual bond premium rate of One Percent (1%) of the total actual direct costs of labor and materials (before Subcontractor and Contractor mark-ups) will be allowed.
- 7.4. Exclusions From Mark-Up of Actual Costs. Mark-ups on the actual cost of materials/equipment incorporated into a Change or for purchase/rental of Construction Equipment shall not be applied to any portion of such costs which are for sales, use or other taxes arising out of the purchase of materials/equipment and/or for purchase/rental of Construction Equipment.
8. Rain Days.
- 8.1. Rain Days Defined and Limitations on Rain Days. In addition to the requirements and limitations set forth in the Contract Documents, including without limitation Article 7.4.1 of the General Conditions, the Contract Time will be adjusted for unusually severe weather conditions resulting from rainfall only if: (i) the Contractor has taken reasonable measures to proceed with the Work notwithstanding inclement weather conditions; (ii) the Contractor demonstrates (by schedule analysis or other means) to the reasonable satisfaction of the District that the progress of Work on the critical path of the then current Construction Schedule was affected by unusually severe weather conditions resulting from rainfall; and (iii) the Contractor demonstrates to the reasonable satisfaction of the District that the Contractor could not re-sequence Work so that Work activities (whether or not on the critical path of the then current Construction Schedule) not affected by rainfall could have been performed on a Rain Day. The occurrence of precipitation by itself shall not constitute a Rain Day. For purposes of the Contract Documents, a Rain Day occurs when: (i) there is measurable rainfall occurring on a day when Work is scheduled to be performed at the Site; (ii) there is rainfall sufficiently continuous for at least a three (3) hour period; (iii) the rainfall is sufficiently severe to prevent performance of Work at the Site (rainfall is not deemed sufficiently severe to prevent Work at the Site if there are Work activities which are not materially affected by rainfall and which can be reasonably performed by the Contractor by re-sequencing Work activities); and (iv) after a Rain Day (as defined in (i), (ii) and (iii) above) has occurred, the conditions at the Site are adversely affected by rainfall so that a period of time is necessary to

permit sufficient “drying out” of wet conditions at the Site sufficient to permit the continuation of Work.

- 8.2. Rain Days Incorporated Into Construction Schedules. Construction Schedules prepared by the Contractor shall incorporate the following Rain Days. The Contract Time shall not be subject to adjustment for unusually severe weather conditions until the number of Rain Days noted below are exceeded.

Month	Rain Days
January	four (4)
February	four (4)
March	three (3)
April	two (2)
May	two (2)
June	none
July	none
August	none
September	none
October	two (2)
November	three (3)
December	four (4)

9. Hours and Days of Work at the Site.

- 9.1. Work Hours/Days. Subject to limitations set forth elsewhere in the Contract Documents and below, the hours/days of Work at the Site are: 7am – 5pm Mondays through Fridays, except for holiday days.
- 9.2. Limitations on Work Hours/Days. Work activities at the Site will be limited or prohibited on days: (i) devoted to student testing or when testing of students may be adversely affected by Work activities at the Site; or (ii) when other special events or functions are scheduled. The Contractor shall familiarize itself with District activities at the Site to avoid Work activity interferences or disturbances to such District activities. The Contractor’s Construction Schedule shall take into account the District activities which limit or preclude Work activities at the Site.
- 9.3. Facilities/Services for District Inspector. Unless otherwise expressly provided in the Contract Documents, pursuant to Article 4.14.2 of the General Conditions, the Contractor, without adjustment of the Contract Price, shall provide, or cause to be provided, for use by the District Inspector during prosecution of the Work, the following: (i) lockable temporary office space consisting of sufficient space to accommodate Project Inspectors assigned to the Work; (ii) furniture and furnishings consisting of desks and chairs for use by Project Inspectors assigned to the Work, file storage, one (1) conference table and seating sufficient to accommodate seating for at least four (4) people; (iii) landline phone; (iv) plain paper fax machine; (v) landline telephone and fax service; (vi) internet service; and (vii) plain paper copier with copy speed of no greater than thirty five (35) pages per minute.

- 10. Permits, Fees and Approvals. In addition to permits or approvals obtained by the District for the Work, the Contractor shall obtain the following permits, approvals and other authorizations from any public agency with jurisdiction over any portion of the Work. The Contractor shall obtain the permits, approvals and/or authorizations set forth below: (i) without adjustment of the Contract Price, unless otherwise indicated below; and (ii) without adjustment of the Contract Time.

Contractor Obtained Permit, Approval or Authorization	Cost Reimbursement
Deferred Approval Items	No reimbursement to Contractor; cost included in Contract Price.

For any work requiring City or County review and/or approval including the Merced County Health Department, Contractor shall coordinate and schedule inspections with City or County department

11. Construction Utilities. The Contractor shall obtain and pay for all site utilities required to complete the Work.

12. Use of Site.

- 12.1. Staging/Storage. Staging/storage areas shall be restricted to areas designated in the Contract Documents for such purposes. The Contractor, without adjustment of the Contract Price or the Contract Time, shall secure and pay for the use of additional storage, staging areas, or work areas needed for operations. The Contractor and Subcontractors are responsible for following the requirements established in the Contract Documents for deliveries, storage trailers, office trailers and temporary utilities. The Contractor and Subcontractors shall coordinate material and equipment deliveries with the District and to ensure that materials can be off-loaded efficiently and that Site use operations are maintained in an orderly fashion. If any materials or equipment stored at the Site obstruct the performance of any portion of the Project or otherwise interfere with District operations or activities, these materials shall be removed and relocated by the Contractor without adjustment of the Contract Price or the Contract Time. If the Contractor fails or refuses to comply with the foregoing staging/storage requirements and limitations within a reasonable time, but not more than twenty four (24) hours after notice, the District reserves the right to take measures to comply with such requirements or limitations, with the costs of such measures being the sole responsibility of the Contractor.
- 12.2. Site Logistics Plan. Prior to commencement of Work at the Contractor, the Contractor prepare a Site Logistics Plan which include, without limitation: delivery routes, storage/staging areas, jobsite trailer locations, wash out areas, and other similar activities. The Site Logistics Plan shall: (i) take into account emergency vehicle ingress/egress; pedestrian paths of travel and disabled persons paths of travel; (ii) be subject to review and acceptance by the District; and (iii) be subject to modification during performance of the Work.
- 12.3. Parking. Personnel of the Contractor, Subcontractors and others performing Work at the Site will be allowed to park vehicles in the staging area as designated in the specifications, or areas outside the Site, with a valid District parking permit, in the parking spaces at a location designated by the District. Parking permit charges, if any, shall be borne and paid by the Contractor without adjustment of the Contract Price. The foregoing notwithstanding, the extent or location of parking for such personnel may be limited, restricted, eliminated or modified by the District as reasonably necessary to facilitate and accommodate necessary parking for the District's students, staff and visitors. Neither the Contract Price nor the Contract Time shall be adjusted as a result of any such District modifications to the extent or location of parking.
- 12.4. Prohibition on Smoking. The District has implemented policies and practices limiting and restricting smoking on District property, including the Site. The Contractor is solely responsible for obtaining the District's current non-smoking policy and: (i) notifying Subcontractors of the District's non-smoking policies; (ii) informing employees of the Contractor and Subcontractors of the District's non-smoking policies; (iii) posting notices at the Site summarizing the District's non-smoking policies; (iv) complying with the Laws relating to smoking limitations and restrictions; and (v) taking appropriate actions if the District's non-smoking policies are violated or limitations/restrictions imposed by the Laws are violated, including without limitation, removal of personnel violating such policies, limitations or restrictions.

[END OF SECTION]

Scope of work as specified in Project Manual & Drawings

Construction and installation of new modular classrooms, prefabricated greenhouse, accessible route connecting the new buildings to existing walkway, and related utility work. Stockpiled classrooms to receive modified door hardware and electrical receptacles.



MEMORANDUM

April 12, 2022

| Via Email

TO: Chief Business Officers

FROM: Marc A. LeForestier
General Counsel

RE: Contractor and Grantee Compliance with Economic Sanctions Imposed in Response to Russia's Invasion of Ukraine

On March 4, 2022, Governor Gavin Newsom issued [Executive Order N-6-22](#) (EO) (available here: <http://www.gov.ca.gov/wp-content/uploads/2022/03/3.4.22-Russia-Ukraine-Executive-Order.pdf>) regarding sanctions in response to the Russian invasion of Ukraine.

The EO directs all agencies and departments that are subject to the Governor's authority to take certain immediate steps, including notifying all contractors and grantees of their obligations to comply with existing economic sanctions imposed by the U.S. government in response to Russia's actions in Ukraine, as well as any sanctions imposed under state law. As you know, many community college districts contract with the California Community Colleges Board of Governors, and this memorandum is shared with the listserv for this purpose.

This correspondence serves as a notice under the EO that as a contractor or grantee, compliance with the economic sanctions imposed in response to Russia's actions in Ukraine is required, including with respect to, but not limited to, the federal executive orders identified in the EO and the sanctions identified on the U.S. Department of the Treasury website (<https://home.treasury.gov/policy-issues/financial-sanctions/sanctions-programs-and-country-information/ukraine-russia-related-sanctions>). Failure to comply may result in the termination of contracts or grants, as applicable. If you have any questions regarding compliance with these sanctions, they should be addressed to your legal counsel.

Please note that for any agreements or grants valued at \$5 million or more, a separate notification will be sent outlining additional requirements specified under the EO.

###

Chancellor's Office, Division Name

1102 Q Street, Sacramento, CA 95811 | 916.445.8752 | www.cccco.edu



VOLUME 2

Specifications

MERCED COMMUNITY COLLEGE – LOS BANOS CAMPUS

22240 CA-152, LOS BANOS, CA 93635

Merced Community College District
3600 M Street, Merced, CA 95348

DSA Submittal Package

SECTION 02 41 00 DEMOLITION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Furnishing all labor, materials, and equipment necessary for demolition, dismantling, cutting, and alterations as indicated, specified, and required for completion of the Contract, as applicable. Includes items such as the following:
 - a. Protecting existing work to remain.
 - b. Hazardous material identification and removal.
 - c. Utility service and termination.
 - d. Removing debris and equipment.
 - e. Removal of items indicated on Drawings.
 - f. Landscape and sprinkler demolition and reinstall.
 - g. Disposal of material.
- B. Related Sections:
 - 1. District's General Conditions Requirements.
 - 2. Section 31 20 00: Earthwork.
 - 3. Division 33: Utilities
- C. Regulatory Requirements:
 - 1. Conform to applicable jurisdictional authority regulations and codes for disposal of debris.
 - 2. Coordinate clearing work with utility companies.
 - 3. Maintain emergency access ways at all times.
 - 4. Contractor shall comply with all applicable laws and ordinances regarding hazardous materials, including contaminated soils, hazardous material transformers, and similar materials or components.

1.3 SUBMITTALS:

- A. Schedule: Submit a detailed sequence of demolition and removal work, including dates for shutoff, capping, and continuance of utility services.
- B. Procedures: Submit written procedures documenting the proposed methods to be used to control dust and noise.

1.4 EXISTING CONDITIONS

- A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
- B. Conduct demolition to minimize interference with adjacent structures or items to remain. Maintain protected egress and access at all times.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

- A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during Work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
- B. Conduct demolition to minimize interference with adjacent structures or items to remain. Maintain protected egress and access at all times.

3.2 PROTECTION

- A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
- B. In accordance with generally accepted construction practices, Contractor shall be solely and completely responsible for working conditions at the jobsite, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Safety precautions prevent damage to existing elements identified to remain or to be salvaged and prevent injury to the public and workmen engaged onsite. Demolish roofs, walls, and other building elements in such a manner that demolished materials fall within foundation lines of building. Do not allow demolition debris to accumulate onsite. Pull down hazardous work at end of each day; do not leave standing or hanging overnight, or over weekends:
 - 1. Protect existing items that are not indicated to be altered. Protect utilities designated to remain from damage.
 - 2. Protect trees, plant growth, and features designated to remain as final landscaping as shown on Drawings.
 - 3. Protect bench marks from damage or displacement.
- D. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.
- E. Fire Safety: Contractor shall conform to Chapter 33 of the California Fire Code (CFC), "Fire Safety During Construction and Demolition," at all times during the construction process. A copy of this chapter can be provided.
- F. Any construction review of Contractor's performance conducted by the geotechnical Engineer is not intended to include review of the adequacy of Contractor's safety measures in, on, or near the construction site.
- G. Surface Drainage: Provide for surface drainage during period of construction in a manner to avoid creating nuisance to adjacent areas. Contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of Work, regardless of cause, source, or nature of water.

- H. Adjacent streets and sidewalks shall be kept free of mud, dirt, or similar nuisances resulting from earthwork operations.
- I. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

3.3 EXAMINATION

- A. Examine conditions of work in place before beginning Work; report defects.
- B. Report existence of hazardous materials or unsafe structural conditions.

3.4 PREPARATION

- A. Scheduling:
 - 1. General: Coordinate and schedule demolition work as required by Owner and as necessary to facilitate construction progress.
- B. Hazardous Materials:
 - 1. General: Identify chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations, and notify such jurisdictional agencies as may be required. Collect and legally dispose of such materials at official disposal locations away from the site.
 - 2. Asbestos: If asbestos or materials containing asbestos are encountered, stop work immediately and contact Owner. Do not proceed with demolition until directed by Owner.
- C. Utility and Service Termination:
 - 1. Locate and identify existing utility, service, and irrigation system components affected by Work of this Contract. Review existing record Drawings, conduct site investigations, contact Underground Service Alert and other qualified cable/pipe/line locator services, and implement all other means necessary to define the location of underground systems.
 - 2. Prior to beginning any demolition, properly disconnect all water, gas, and electrical power supply at appropriate disconnect locations. Obtain all necessary releases and approvals from serving utility companies.
 - 3. Prior to demolition or disconnect, obtain Owner's approval that such system does not impact facilities or systems beyond the extent of this Contract.
 - 4. Mark location of disconnected systems. Identify and indicate stub-out locations on Project record documents.
- D. Verify that existing plant life and features designated to remain are tagged or identified.
 - 1. Architect will mark the features, trees, and shrubs to remain within the construction area. Contractor shall not commence clearing and grubbing operations until authorized by Owner and all protective measures are in place.
- E. Coordinate the time and duration of all system disconnects with Owner.

3.5 DEMOLITION

- A. General Requirements:
 - 1. Clear areas required for access to site and execution of Work, including pavement, structures, foundations, vegetation, trash, and debris.
 - 2. Coordinate with Owner the time of day and route to remove demolished materials from premises.

3. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.
 4. Remove all buried debris, rubble, trash, or other material not deemed suitable by the geotechnical Engineer.
 5. Fill all voids or excavations resulting from clearing, demolition, or removal of vegetation with specified fill material.
- B. Fixture and Equipment Removal:
1. Remove existing fixtures and equipment as identified and shown on Drawings and required by Architect.
 2. Verify all service connections to fixtures and equipment designated for removal have been properly disconnected.
 3. Remove all conductors from conduit at all abandoned circuits.

3.6 UTILITY AND BUILDING SERVICES REMOVAL AND RE-INSTALLATION

- A. Where crossing paths and potential points of interference with existing utility services are shown or can be reasonably inferred from surface conditions or evidence of subsurface systems, such as meter boxes, vaults, relief vents, cleanouts, and similar components:
1. Review all Contract Documents showing crossing paths and potential points of interference.
 2. Pot-hole or determine by other means the accurate depth and location of such utilities.
 3. Incorporate all costs required to complete work under this Contract, including additional trenching, re-routing of existing and new utilities, and all means necessary to construct work under this Contract.
 4. No additional cost to Owner will be allowed for work necessary to accommodate utility conflicts where such crossing paths are shown on Contract Drawings or can be reasonably inferred from surface conditions or components.
- B. Remove all conductors from conduit at all abandoned electrical circuits.
- C. Seal off ends of all piping, drains, and other components as directed by Architect and serving utility.
- D. Where necessary to maintain service to existing utility and building systems, relocate or redirect all conduit and conductors, piping, drains, and associated system components:
1. Re-circuit all electrical as required.
 2. Re-circuit all landscape irrigation valving and control systems as required.
 3. Temporarily terminate landscape system components in approved boxes or with approved caps, suitable for re-connection or extension.
 4. Extend or otherwise modify all site drainage systems, including catch basins, drain inlets, and piping. Fine grade to maintain proper drainage flow pattern to drains.
- E. Demolish structure in an orderly and careful manner:
1. Use of explosives prohibited.

3.7 SITE PAVEMENT REMOVAL

- A. Remove sidewalk and curb where required for new construction as specified and as indicated on the Drawings:
1. Remove all paving by saw-cutting.
 2. Remove concrete paving and curbing at locations shown on Drawings. Locate closest adjacent expansion or weakened plane joint to define start of removal or saw-cutting.
- B. Remove asphalt concrete paving areas where required for new construction as specified

and as indicated on the Drawings:

1. Remove all paving by saw-cutting.
2. Remove paving assembly as required to expose subgrade.

3.8 LANDSCAPE AND IRRIGATION SYSTEMS DEMOLITION AND RENOVATION

A. Clearing, Grubbing, and Planting Demolition:

1. Remove grass and grass roots to a minimum depth of two inches (2") below existing grade.
2. Remove all shrubs, plants, and other vegetation within the area of the work unless designated to remain. Grub and remove all roots of all vegetation to a depth of 24 inches below existing grade.
3. Remove only those trees that are specifically designated for removal, or as shown on the Drawings, within the construction area. Remove all stumps. Remove root ball and root systems larger than one inch (1") in diameter to a depth of two feet (2') below existing or finished grades, whichever is lower, and a minimum of five feet (5') beyond the edge of paving, structure, wall, or walkway.
4. Hand cut existing tree roots over one inch (1") in diameter as necessary for trenching or other new construction. Apply multiple coats of emulsified asphalt sealant especially made for horticultural use on cut or damaged plant tissues to cut faces and adjacent surfaces. Cover exposed roots with wet burlap to prevent roots from dying out until backfilling is complete.
5. Disking and mixing of vegetation, trash, debris, and other deleterious materials with surface soils prior to grading is not permitted.
6. Remove all buried debris, organic material, rubble, trash, or other material not deemed suitable by the geotechnical Engineer.
7. Fill all voids or excavations resulting from clearing, demolition, or removal of vegetation with fill material in compliance with Section 31 00 00: Earthwork.
8. Selected equipment of such sizes and capacities that the existing environment is disturbed as little as possible, and to afford ease of mobility within limited and relatively confined work areas. Make every effort to preserve the topography in its natural state.
9. Keep drains, catch basins, surface drainage courses, and related drainage system components clear of debris and construction materials.
10. Remove irrigation piping and appurtenances as necessary within area of work, unless noted otherwise to remain. Replace irrigation piping and appurtenances to irrigate new and/or existing landscaping. Contractor shall be responsible for temporary landscape irrigation until such time that irrigation system is restored and operational.

3.9 DISPOSAL

- A. Demolished materials become property of the Contractor and shall be removed from premises, except those items specifically listed to be retained by Owner.
- B. Dispose of all demolished material, trash, debris, and other materials not used in the work in accordance with the regulations of jurisdictional authority.
- C. It is required that all materials that are of a recyclable nature, be transported to a suitable legal recycling facility instead of a dump or refuse facility (unless they are one-in-the same).
- D. Burning and Burying of Materials: **Not allowed.**
- E. Haul Routes:
 1. Obtain permits as required by jurisdictional agencies. Establish haul routes in advance; post flagmen for the safety of the public and workmen.
 2. Keep streets free of mud, rubbish, etc. Assume responsibility for damage resulting from hauling operations; hold Owner free of liability in connection therewith.

- F. Remove demolished materials and debris from site on a daily basis.

3.10 CLEANING

- A. Upon completion of work of this Section, promptly remove from the working area all scraps and debris.
- B. Clean excess material from the surface of all remaining paved surfaces and utility structures.
- C. Power wash all concrete surfaces to remove stains, dried mud, tire marks, and rust spots.

END OF SECTION 02 41 00

SECTION 22 00 00 - GENERAL PLUMBING PROVISIONS

PART 1 GENERAL

1.1 GENERAL CONDITIONS

- A. The foregoing General and Special Conditions shall form a part of this Division with the same force and effect as though repeated herein. The provisions of this Section shall apply to all the Sections of Division 22.

1.2 CODES AND REGULATIONS

- A. All work and materials shall be in full accordance with current rules and regulations of applicable codes and all California Amendments. Nothing in these drawings or specifications is to be construed to permit work not conforming to these codes. Should the drawings or specifications call for material or methods of construction of a higher quality or standard than required by these codes, the specifications shall govern. Applicable codes and regulations are:
1. California Code of Regulations – CCR:
 - a. Title 8, Industrial Relations.
 - b. Title 24, Building Standards.
 2. California Building Code – CBC.
 3. California Mechanical Code – CMC.
 4. California Plumbing Code – CPC.
 5. California Fire Code – CFC.
 6. California Green Building Code.
 7. American Gas Association – AGA.
 8. American National Standards Institute – ANSI.
 9. American Society of Heating, Refrigerating and Air Conditioning Engineers – ASHRAE.
 10. American Society of Mechanical Engineers – ASME.
 11. American Society for Testing and Materials – ASTM.
 12. American Water Works Association – AWWA.
 13. Cast Iron Soil Pipe Institute – CISPI.
 14. California Electrical Code – CEC.
 15. National Electrical Manufacturers Association – NEMA.
 16. National Fire Protection Association – NFPA.
 17. National Sanitation Foundation – NSF.
 18. Plumbing and Drainage Institute – PDI.
 19. Sheet Metal and Air Conditioning Contractors National Association – SMACNA.
 20. Underwriters' Laboratory – UL.
 21. Occupational Safety and Health Act - OSHA.
 22. California Assembly Bill 1953 (AB1953).

1.3 PERMITS AND FEES

- A. The Contractor shall take out all permits and arrange for all tests in connection with his work as required by local ordinances. All charges are to be included in the work. Permits for equipment connected to a particular system are to be considered as a part of the work included under each system; for example, permits for electric motor connection are part of electrical work, permits for domestic water or gas connections are part of plumbing work. All charges for service connections, meters, etc. by utility companies or districts shall be included in the work.

1.4 COORDINATION OF WORK

- A. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. The actual locations of all materials, piping, fixtures, equipment, supports, etc. shall be carefully planned, prior to installation of any work, to avoid all interferences with each other, or with structural, electrical or architectural elements. Verify the proper voltage and phase of all equipment with the electrical plans. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment.

1.5 GUARANTEE

- A. Guarantee shall be in accordance with the General Conditions. These specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the Certificate of Guarantee shall be furnished to the Owner through the Engineer.

1.6 EXAMINATION OF SITE

- A. The Contractor shall examine the site, compare it with plans and specifications, and shall have satisfied himself as to the conditions under which the work is to be performed. No allowance shall subsequently be made in his behalf for any extra expense to which he may be put due to failure or neglect on his part to make such an examination.

1.7 SUBMITTALS

- A. Submit shop drawings in accordance with Division 01.
- B. Shop Drawings: Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc. proposed for use on this project. Material and equipment shall not be ordered or installed until written review is processed by the Engineer. Any item omitted from the submittal shall be provided as specified without substitution. All shop drawings must comply with the following:
 - 1. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the specifications or on the drawings. Descriptive literature shall be current factory brochures and submittal sheets. Capacities shall be certified by the factory.
 - 2. All shop drawings shall be submitted at one time in a neat and orderly fashion in a suitable binder with title sheet including Project, Engineer and Contractor; Table of Contents; and indexed tabs dividing each group of materials or item of equipment. All items shall be marked with the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on the drawings.
 - 3. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be highlighted, circled, or underlined on the shop drawings. Calculations and other detailed data indicating how the item was selected shall be included for items that are not scheduled. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled, or detailed.
- C. Substitutions: Manufacturers and model numbers listed in the specifications or on the drawings represent the standard of quality and the features desired. Unless otherwise noted, alternate manufacturers may be submitted for review by the Engineer. Calculations and other detailed data indicating how the item was selected shall be included. The Contractor shall assume full responsibility that substituted items or procedures will meet the specifications and job requirements and shall be responsible for the cost of redesign and

modifications to the work caused by these items.

- D. Review: Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment, and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept; that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. The Contractor shall agree that if deviations, discrepancies or conflicts between shop drawings and design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed.

1.8 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Submit one electronic pdf copy for review and after approved submit three hard copies of the Operation and Maintenance Instructions and Wiring Diagrams for all equipment and parts lists for all equipment, etc. shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. WH-1). All wiring diagrams shall agree with revised shop drawings and indicate the exact field installation. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. Water Heaters, Pumps, Motors, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included.
- B. Verbal: The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The controls contractor shall present that portion of the instruction that applies to the control system. The Engineer's office shall be notified 96 hours prior to this meeting.
- C. Acknowledgment: The Contractor shall prepare a letter indicating that all operation and maintenance instructions (printed, verbal and posted) have been given to the Owner, to the Owner's satisfaction. This letter shall be acknowledged (signed) by the Owner and submitted to the Engineer.

1.9 RECORD DRAWINGS

- A. The Contractor shall maintain a set of prints for the project as a record of all construction changes made. As the Work progresses, the Contractor shall maintain a record of all deviations in the Work from that indicated on the drawings. Final location of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, i.e. buildings, curbs and walks. In addition, the water, gas, sewer, etc. within the building shall be recorded by offset distances from building walls. The original drawings will be made available to the Contractor from which he shall have a set of reproducible drawings made. The Contractor shall then transfer the changes, notations, etc. from the marked-up prints to the reproducible drawings. The record drawings (marked-up prints and reproducibles) shall be submitted to the Engineer for review (as an alternative, the marked-up prints may be photocopied full size on reproducible stock).

PART 2 PRODUCTS

2.1 PROTECTIVE COATING FOR UNDERGROUND PIPING

- A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, X-Tru Coat, Scotchkote. All fittings and areas of damaged coating shall be covered with two layer double wrap of 10 mil polyvinyl tape to total thickness of 40 mils. Manville Corporation. Protective coating shall be extended 6" above surrounding grade.

2.2 CONCRETE ANCHORS

- A. Concrete Anchors shall comply with CBC 1901A.3. Steel stud with expansion anchor requiring a drilled hole; powder driven anchors are not acceptable. Minimum concrete embedment shall be 4-1/2 diameters. Minimum spacing shall be 10 diameters center-to-center and 5 diameters from center to edge of concrete. Maximum allowable stresses for tension and shear shall be 80% of the test report values "with special inspection". Anchors shall be Hilti, Philips - or Approved equal.

2.3 SEISMIC RESTRAINTS

- A. All plumbing systems (all equipment, piping, etc.) shall be provided with seismic restraints in accordance with "Seismic Restraint Systems Guidelines" OPM-0052-13 by Eaton/ Tolco.

2.4 SYSTEM IDENTIFICATION

- A. Above Grade Piping: Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, either by preprinted markers or stenciled marking, and include arrows to show the direction of flow. Comply with ANSI A13.1 for colors. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through floor, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portion of lines. Marking of short branches and repetitive branches for equipment connections is not required.
- B. Equipment: All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. WH-1). Provide 1/2" high lettering, white on black background. Nameplates shall be permanently secured to the unit.
- C. Valves: Provide valve tags on all valves of each piping system, excluding check valves, valves within equipment, faucets, stops and shut-off valves at fixtures and other repetitive terminal units. Provide brass tags or plastic laminate tags. Prepare and submit a tagged valve schedule, listing each valve by tag number, location, and piping service. Mount in glazed frame where directed.

2.5 EQUIPMENT SUPPORT FRAMES

- A. Unless specifically noted otherwise, it shall be the responsibility of Plumbing Contractor to furnish and install all support frames for its equipment.

PART 3 EXECUTION

3.1 SCHEDULING OF WORK

- A. All work shall be scheduled subject to the approval of the Engineer and Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site.

3.2 CONDUCT OF WORK

- A. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work contracted for as rapidly as possible consistent with good work and shall cause no delay to other Divisions engaged upon this project or to the Owner.
- B. Plumbing Contractor shall arrange for all cutting necessary for the proper installation of its work, providing all sleeves and chases necessary. Cutting shall not be done in such a manner to impair the strength of the structure. Any damage resulting from work shall be repaired by the Contractor at his expense to the satisfaction of the Engineer.
- C. Progressively, daily at the completion of each day's work, and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work.
- D. **IAQ Management plan will be in effect for Cal Green requirements. Adhesives and mastic must comply with low VOC requirements and documentation (MSDS, etc.) shall be provided with submittals.**

3.3 EXCAVATION AND BACKFILL

- A. Excavation: Trenches are to be excavated to grade and depth established by drawings. Unless otherwise noted, minimum earth cover above top of pipe shall be 24", not including base and paving in paved areas. Width of trenches at top of pipe shall be a minimum of 16" plus the outside diameter of the pipe. Provide all shoring required by site conditions. Barrel of pipe shall have uniform support on trench bottom, hand excavate additional depth at bells, hubs, and fittings. Where over-excavation occurs, provide compacted selected backfill to pipe bottom. Where ground water is encountered, remove to keep excavation dry, using well points and pumps as required.
- B. Backfill:
 - 1. Around Pipe and to One Foot Above Pipe: Material shall be river run sand or native granular free flowing material, free of clay lumps, silt or vegetable matter and shall have 100% passing through the No. 4 sieve and a maximum of 3% passing through the No. 200 sieve. Place carefully around and on top of pipe, taking care not to disturb piping. Consolidate with vibrator.
 - 2. One Foot Above Pipe to Grade: Material to be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed, to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to approval by the Engineer.
 - 3. Remove all water sensitive settlement from trench backfill regardless of location and compaction requirements.
- C. Compaction: Compact to a density of 95% within building and 90% outside building. Demonstrate proper compaction by testing at one-half of the trench depth. Perform three tests per 100' of trench.

3.4 OPENINGS, CUTTING AND PATCHING

- A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. The actual openings and the required cutting and patching shall be provided. Coring through existing concrete or masonry walls, floors, ceilings, foundations, footings, etc., and saw cutting of concrete floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this

Division. Patching of these surfaces shall also be provided. Cutting and coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

3.5 MANUFACTURER'S RECOMMENDATIONS

- A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of a particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site through the construction of the project.

3.6 QUIETNESS

- A. Piping and equipment shall be arranged and supported so that vibration is a minimum and is not carried to the building structure or spaces.

3.7 DAMAGES BY LEAKS

- A. The Contractor shall be responsible for damages to other work caused by leaks in the temporary or permanent piping systems prior to completion of work and during the period of the guarantee, and for damages to other work caused by disconnected pipes or fittings, and the overflow of equipment prior to completion of the work.

3.8 CLEANING

- A. Progressively and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work.

END OF SECTION 22 00 00

SECTION 22 00 01 - PLUMBING

PART 1 GENERAL

1.1 GENERAL CONDITIONS

- A. The foregoing Section 22 00 00, General Plumbing Provisions shall form a part of this specification.

1.2 SCOPE

- A. Included: Perform all work necessary and required to complete construction as indicated. Such work includes the furnishings of all labor, materials, and services necessary for a complete, lawful, and operating plumbing system with all equipment as shown or noted on the drawings or as specified herein. The work includes, but is not necessarily limited to, the following:
 - 1. Sanitary sewer system.
 - 2. Domestic water system.
 - 3. Plumbing fixtures.
 - 4. Plumbing equipment.
 - 5. Condensate drains.
 - 6. Storm drain system.
- B. Work Specified Elsewhere:
 - 1. Line voltage power wiring (60 volts or greater), motor starters in motor control centers, and disconnect switches are included in the Electrical Division, unless otherwise noted.
 - 2. Access doors.
 - 3. Concrete and reinforcing steel.

1.3 CODES AND STANDARDS

- A. All pipe, pipe or plumbing fittings or fixture, solder, or flux shall be lead free that provides water for human consumption per California Assembly Bill 1953 (AB1953).
- B. See Section 22 00 00 for additional requirements.

1.4 SUBMITTALS

- A. Provide product data for all materials per Division 01.

PART 2 MATERIALS

2.1 PIPING MATERIALS

- A. Sanitary Sewer:
 - 1. Soil, Waste and Vent Piping:
 - a. Inside Building and Within Five Feet of Building Walls: Standard weight coated cast iron pipe and fittings. Plain end with neoprene gasket and stainless steel retaining sleeve, CISPI 301, ASTM A888 hubless cast-iron, or hub end with rubber gasket, ASTM A74, ASTM C564. Size 2" and smaller above grade may be standard weight galvanized steel, ASTM A53, with coated cast iron recessed drainage fittings, ANSI B16.12. All cast iron pipe and couplings shall be American made and tested, no imported pipe or coupling is acceptable. Use heavy-duty (4-Band)

couplings for all soil and waste piping. Use standard (2-Band) couplings for all vent piping. Tyler Pipe, AB & I Foundry or Charlotte Pipe. Couplings shall be Tyler, Anaco or Husky.

- b. Outside Building:
 - 1) For domestic waste only: Polyvinyl chloride gravity sewer pipe with bell and rubber Z-gasket, ASTM D3034, SDR 35. Carlon, J.M.
 - 2) PVC-DWV sewer pipe with solvent weld, ASTM D2665. Schedule 40 wall thickness. Traps, sink outlets, cleanouts, etc., shall be same material. Traps shall have union connections.
 - 3) Where cover is less than 15", pipe shall be cast iron, same as for inside of building.
 2. Cleanouts: Floor cleanouts: Smith 4020 with nickel bronze top in finished areas; Smith 4220 in utility areas. Wall cleanouts: Smith 4530 with stainless steel cover and screw. Comparable models of Josam, Wade, Zurn or equal.
 3. Cleanout Box: Precast reinforced concrete. Cast iron lid marked for service. Christy or equal; F22 in foot traffic area; G5 in roadways.
- B. Storm Drain:
1. Piping:
 - a. Inside Building and Within Five Feet of Building walls: Same as Soil, Waste, and Vent Piping.
 - b. Outside Building:
 - 1) 10" and Smaller: Standard strength non-reinforced concrete bell and spigot, ASTM C14, or Polyvinyl chloride gravity sewer pipe with bell and rubber Z-gasket, ASTM D3034, SDR 35. Carlon, J.M. Where cover is less than 15", same as for inside building.
 - 2) 12" and Larger: Reinforced concrete, Class III, 2000 D-load, ASTM C76.
 - 3) Fittings: Fittings and couplings shall be specifically designed for the type of pipe used. Fittings and couplings designed for perforated or under drain piping will not be allowed.
- C. Water:
1. Hot and Cold Water Piping:
 - a. Inside Building: Type L hard temper seamless copper, ASTM B88. Wrought copper fittings ANSI B16.22. Vacuum pipe shall have long sweeping elbow fittings. 95/5 tin-silver soldered joints. Brazesafe, Silcan or equal brazing material.
 - b. Outside Building Below Grade: Same as Inside Building with protective coating on ferrous pipe or Schedule 40 PVC pipe thru 2", Class 315 2" thru 4".
- D. Condensate Drain Piping: Same as cold water piping.
- E. Valves and Specialties:
1. Valves:
 - a. General: Manufacturer's model numbers are listed to complete description. Milwaukee, Kitz, Apollo, Nibco, Stockham or equal. All valves shall be full size of upstream piping. **Ball valves shall be substituted for gate valves 2" and smaller. Butterfly valves shall be substituted for gate valves 2-1/2" and larger. Cv factors for ball valves shall not be less than equal size gate valves.**
 - b. Gate Valve: 2" and smaller: All bronze, rising stem, union bonnet, wedge disk, 200 psi WOG. Milwaukee No. 1152. The material of the valve stem shall be limited to a maximum of six (6) percent zinc content. 2-1/2" and larger: Iron body, bronze mounted. Non-rising stem. Wedge disk. 200 psi WOG. Flanged or AWWA hub as applicable. Open/ closed indicator. Milwaukee No. F2882. Underground valves shall have square operating nut.
 - c. Check Valve: 2" and smaller: All bronze swing check, regrinding. 200 psi WOG.

Milwaukee No. 509, 1509 or equal. 2-1/2" and larger: Non-slam type, 125 psi iron body wafer type with renewable seats and stainless steel spring. Milwaukee 1400 series or equal.

- d. Plug Valve: Eccentric bronze plug. Nickel chromium alloy iron body. Bronze bushings. Buna-N O-rings. UL approved for gas distribution. 175 psi WOG. DeZurick Series 400 or equal.
 - e. Ball Valves: Two or three piece construction, forged bronze body, chrome plated brass ball, threaded ends, teflon seats, PTFE or reinforced teflon stem seals, lever handle. Underground valves shall have "T" handle. Provide one operating "T" extension handle for all underground valves. Milwaukee BA100/150, BA300/350, Nibco or equal.
 - f. Valve Box: Precast reinforced concrete. Cast iron lid marked for service. Christy or equal; F22 in foot traffic areas: G5 in roadways.
 - g. Butterfly Valve: Iron Body, Aluminum bronze disk (connection to shaft shall not be by pins, screws, or bolts). Ductile body PPS coated with EPPM coated ductile disc. O-ring seals. Resilient removable seat. 416 stainless steel two piece shaft. 6" and smaller valves shall have multi-position lever handle. Underground valves shall have square operating nut. Provide one operating "T" handle for underground valves. Provide 2" extension neck at insulated pipes. Milwaukee "C" series, Kitz or equal.
2. Miscellaneous Specialties:
- a. Temperature and Pressure Relief Valve: ASME rated fully automatic, reseating combination temperature and pressure relief valve sized in accordance with energy input. Sensing element immersed within upper 6" of tank. Watts.
 - b. Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi.
 - c. Dielectric Coupling: Insulating coupling rated for 250 psig. EPCO or equal.
 - d. Shock Absorbers: Sioux Chief "Hydra-Rester", Zurn "Shoktrol", PPP "SC Series" or equal.
- F. Miscellaneous Piping Items:
1. Pipe Support:
 - a. Pipe Hanger: Adjustable split ring, swivel hanger and rod. Black malleable iron. Size and maximum load per manufacturer's recommendation. Felt lined, B-Line B3690F, Unistrut or equal.
 - b. Construction Channel: 12 gage 1-5/8" x 1-5/8" steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Unistrut, Superstrut or equal.
 2. Pipe Sleeves: 24 gage galvanized steel. Adjus-to-Crete #10 with #99 thimble for floors. #100 for walls.
 3. Flashing: Vent flashing and flashing for piping through roof shall be prefabricated 24 gauge galvanized steel roof jacks with 8" square flange around pipe sealed with weatherproofing mastic.

2.2 PIPING INSULATION MATERIALS

- A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.
- B. Pipe Insulation: Elastomeric type, ASTM C534, with a thermal conductivity of 0.27 at 75°F when measured in accordance with ASTM C177 or ASTM C518.
 1. Wall thickness: 3/4 in.
 2. Adhesive: Conform to Manufacturer's recommendations.
- C. Pre-molded Fiberglass: Heavy density sectional pre-molded fiberglass with vapor barrier laminated all-service jacket and pressure sealing vapor barrier lap. Thermal conductivity shall not exceed 0.25 Btu-in/hr-sq. ft-degrees F, at a mean temperature of 50 degrees F.

Perm rating 0.02, ASTM E96. Puncture rating 50 Beach units, ASTM D781. Provide 3" (min.) wide tape of same material as lap for butt joints. For hot water piping, thickness shall be 1" for pipe sizes less than 2", 1-1/2" thickness for pipe sizes 2" and larger. CSG Insulation Corp., Manville, Owens-Corning or equal.

- D. Fiberglass Blanket: Unfaced. Thermal conductivity shall not exceed 0.25 Btu-in/hr sq. ft-degrees F, at a mean temperature of 50 degrees F. 1-1/2" thickness. Manville, Owens-Corning or equal.
- E. PVC Jacket (for exposed pipes and fittings): Pre-molded polyvinyl chloride (PVC) jackets. Size to match application. Provide PVC vapor barrier, pressure-sealing tape by same manufacturer. Zeston or equal.

2.3 FIXTURES

- A. General: This Division shall rough-in for and install all plumbing fixtures shown on drawings. All trim not concealed shall be brass with polished chromium plate finish unless otherwise noted. All enameled fixtures shall be acid resisting. Standard color is white unless otherwise noted.
- B. Schedule: Refer to Plumbing Fixture Schedule on the drawings for list of fixtures. Manufacturer's model numbers are listed to complete description. Water consumption quantities listed on schedule are maximum. Equivalent models of American Standard, Crane, Haws, Kohler, Eljer, Zurn or equal. For drainage fixtures, equivalent models of Josam, Smith, Wade, Zurn or equal.
- C. Stops and P-traps: All fixtures shall be provided with stops and p-traps as applicable.
 - 1. Stops: All hot and cold water supplies shall be 1/2" angle stops with IPS inlets and compression outlets, stuffing box, screwdriver lock shield, and 1/2" flexible brass tubing riser. Speedway. Wall mounted trim shall have concealed loose key wall stop. Chicago 1771 or equal.
 - 2. P-traps: Brass, ground joint. 17 gage. American Standard, California Tubuler or equal.
 - a. Trap primers shall be provided with ball valve and cylinder key-lock access panel for all floor drains and floor sinks. PPP, Inc. or equal.

2.4 EQUIPMENT

- A. General Requirements:
 - 1. General: These equipment specifications are to supplement the drawings. Refer to schedules on drawings for the specific equipment to be provided. Capacities shall be in accordance with the schedules shown on the drawings. Capacities are to be considered minimum.
 - 2. Dimensions: Equipment must conform to space requirements and limitations as indicated on the drawings and as required for operation and maintenance. Equipment will not be accepted that does not readily conform to space conditions.
 - 3. Ratings: Electrical equipment shall be in accordance with NEMA Standards and UL listed where applicable standards have been established.
 - 4. Basis of Design: Manufacturers and model numbers listed in schedules as the basis of design are intended to represent the standard of quality and the features desired.
 - 5. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
 - 6. Electrical:
 - b. General: Each item or assembly of items shall be furnished completely wired to

individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls not included in equipment package. Manual and magnetic starters shall have ambient compensating running over-current protection in all ungrounded conductors. Magnetic starters shall be manual reset. Controllers and other devices shall be in NEMA 3 or 12 enclosures as applicable.

- c. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts, and other devices shall be in ungrounded conductors.
 - d. Motors: Shall be rated, constructed, and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be open drip-proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction. Design shall limit starting inrush current and running current to values shown on drawings.
 - e. Starters: Motor starters shall be provided for all equipment except where starter is in a motor control center as designated on the electrical drawings.
 - f. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.
 - g. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.
- B. Electric Drinking Fountain: Wall hung, Dual height with Bottle Filler. Provide steel mounting brackets. Stainless steel basin. Removable grid drain. Chrome plated brass bubbler with automatic flow regulator and self-closing valve. Nonferrous evaporator. Hermetic compressor with automatic reset overload protection. Air cooled condenser. Adjustable thermostat. UL listed. ARI certified. Haws, Oasis, Sunroc.

PART 3 EXECUTION

3.1 PIPING INSTALLATION

- A. General:
 - 1. Piping Layout: Piping shall be concealed in walls, above ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Owner's Representative. No structural member shall be cut, notched, bored, or otherwise altered unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Expansion joints shall be installed as required. Vertical lines shall be installed to allow for building settlement without damage to piping. All exposed piping to be primed and painted, see painting section.
 - 2. Joints:
 - a. Threaded: Pipe shall be cut square and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.
 - b. Welded or Brazed: Filler rod shall be of the same suitable alloy as pipe. Welding or brazing shall be performed in accordance with requirements of recognized published standards of practice and by licensed or otherwise certified contractors.

Welder or Brazer shall be a person who specialized in welding or brazing of pipes and holds a recognized certificate of competency from a recognized testing laboratory, based on the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.

- c. Other: Joints other than threaded or welded shall be installed in accordance with manufacturer's recommendations.
 - d. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.
 - e. Electrical Equipment: Joints shall be avoided, where possible, over electrical equipment.
 - f. Copper pipe 1-1/2" or less may be soldered. Above 1-1/2" and all below grade shall be brazed.
3. Fittings:
- a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.
 - b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.
 - c. Unions: A union shall be installed on the leaving side of each valve, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.
 - d. Valves: All valves shall be full line size. At equipment connections, valves shall be full size of upstream piping.
4. Pipe Support:
- a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Refer to drawings for additional requirements and attachment to structure. Vertical piping shall be supported at floor and ceiling. Support pipe within 12" of all changes in direction. Support individual pipes with pipe hanger. All pressure piping, drainage piping above grade and metallic piping of dissimilar metal from hangers shall have isolating shield, or felted hangers.
 - 1) Screwed Pipe:

Pipe Size Between Supports*	Max. Spacing
(in)	(ft)
1/2	6
3/4	8
1	8
1-1/4 & larger	10

* Based on straight lengths of pipe with couplings only. Provide additional supports for equipment, valves, or other fittings.

2) Copper Tubing: Copper tubing shall be supported at approximately six (6) foot intervals for piping one and one-half (1-1/2) inches and smaller in diameter and ten (10) foot intervals for piping two (2) inches and larger in diameter.

3) Gravity Drainpipe: Piping shall be supported at each length of pipe or fitting, but in no case at greater spacing than indicated above for pressure pipe.

b. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for approval.

5. Excavation and Backfill: Minimum cover on all piping shall be as follows unless otherwise noted:

- a. Up to 2-1/2" pipe - 24" cover.
- b. 3" and larger pipe - 30".

6. Miscellaneous:

a. Escutcheons: Provide chromium plated escutcheons where piping penetrates walls, ceilings, or floors in finished areas.

- b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" clearance between sleeve and pipe or pipe insulation.
 - c. Dielectric Couplings: Dielectric couplings shall be installed wherever piping of dissimilar metals are joined.
 - d. Shock Absorbers: Install per manufacturers recommendations.
- B. Sanitary Sewer Piping:
- 1. General: Where inverts are not indicated, sanitary sewer piping shall be installed at 1/4" per foot pitch. Piping 4" and larger may be installed at 1/8" per foot pitch where structural or other limitations prevent installation at a greater pitch.
 - 2. Cleanouts: Install cleanouts at ends of lines, at changes of direction greater than 45 degrees, and at not greater than 100 foot intervals. Locate interior cleanouts in accessible locations and bring flush to finished surface. Cleanouts at urinals shall be installed above urinal.
 - 3. Vents: Vents shall terminate not less than 6" above the roof nor less than 12" from any vertical surface nor within 10 feet of any outside air intake. Install horizontal vent lines at 1/4" per foot pitch. Offset vents 2 feet minimum from gutters, parapets, ridges, and roof flashing.
- C. Water Piping: Connections to branches shall be made from the top side of the main. Supply header in fixture battery shall be full size to last fixture, reducing in size only on individual connections to each fixture in battery. Provide ball valve shutoff for each building and at each connection to equipment and trap primers. Shock absorbers shall be installed in a vertical position at end of branch runs as specified in this section whether specifically shown or not on drawings. Connections to equipment shall be made with flexible connectors. Non-metallic pipe shall have 18 AWG copper tracer wire laid on top of pipe and taped in place at 15-foot spacing, terminate 4" above grade at ends of pipe runs.
- D. Condensate Drain Piping: Install with constant pitch to receptacle, 1/4" per foot where possible, otherwise 1/8" per foot minimum. Provide trap at each air handling unit to prevent air leakage. Connections to equipment shall be made with flexible connection unless connection is internally isolated.
- E. Storm Drain Piping: Install at 1/4" per foot pitch.

3.2 PIPING INSULATION INSTALLATION

- A. Domestic Tempered Water Supply:
- 1. General: All domestic tempered water supply piping, except for exposed connections to fixtures, shall be insulated. Do not insulate unions or valves less than 2", unless exposed to weather.
 - 2. Install elastomeric pipe insulation by slipping over end of pipe. Where not feasible, slit insulation longitudinally, snap over piping and seal with adhesive. Insulate fittings with larger diameter sleeves or insulation, lapping pipe insulation a minimum of 2 in.
 - 3. Butt sections of insulation tightly together and seal with adhesive to provide a continuous vapor and thermal barrier.
 - 4. Pipe: Apply pre-molded fiberglass sections to pipe using integral pressure sealing lap adhesive in accordance with manufacturer's recommendations. Stagger longitudinal joints. Seal butt joints with factory supplied sealing tape.
 - 5. Fittings and Valves:
 - a. Wrap fitting with pre-cut fiberglass blanket to thickness matching adjoining insulation. Cover blanket with PVC jacket in accordance with manufacturer's recommendations. Seal all joints with factory supplied pressure sealing vapor barrier tape with 2" (min.) overlap on both sides of joint. Insulate valves to stem.
 - b. For miscellaneous fittings for which PVC jackets are not available or where proximity of fittings precludes a neat-appearing installation, the contractor may

cover the fiberglass blanket with stretchable glass fabric and at least two coats of vapor barrier coating. All exposed ends of insulation shall be adequately sealed.

- B. ADA Compliant Fixtures:
 - 1. At sinks/ lavatories which are to be ADA Compliant, the p-trap and angle stop assemblies shall be insulated with Trap Wrap Protective Kit 500R by Brocar, Truebro Handi Lav-Guard #102W or #105W or equal. Abrasion resistant exterior cover shall be smooth and have 1/8" wall minimum over cushioned foam insert. Fasteners shall remain substantially out of sight.

3.3 FIXTURE INSTALLATION

- A. Fixture Height: Shall be standard height except those specified as ADA Compliant. Such fixtures shall be mounted in accordance with CBC, Section 11B, Division 6 and drawing details.
- B. Wall Hung Fixtures: Shall be provided with proper backing and hanger plates secured to wall. Fixtures mounted on carriers shall bear against stop nuts, clear of wall surface. Caulk fixtures against walls with white G.E. "Sanitary SCS1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).
- C. Floor Drains or Floor Sinks: Shall be placed parallel to room surfaces, set level, flush with floor, and adjusted at proper height to drain and easily accessible for inspection and cleaning. Cover openings during construction to keep all foreign matter out of drain line.
- D. Other Connections: Rough-in and connection for trim or fixtures supplied by others shall be included in this specification section.
- E. Floor Mounted Fixtures: Shall be provided with proper support plates. Caulk fixtures against floors with white G.E. "Sanitary SCS1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).

3.4 EQUIPMENT INSTALLATION

- A. General: It shall be the responsibility of the equipment installer to ensure that no work done under other specification sections shall in any way block, or otherwise hinder the equipment.
- B. Connections to Equipment: Where size reductions are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

3.5 TESTS AND ADJUSTMENTS

- A. General: Unless otherwise directed, tests shall be witnessed by the Owner's Representative. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test, and repair his work, and that of other contractors, to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested. Tests may be made in sections. However, all connections between sections previously tested and new section shall be included in the new test. New sections shall be isolated from existing sections for testing purposes. There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made. Test the new sections or branches of piping only.

- B. Gravity System:
 - 1. Sanitary Sewer: All ends of the new sections of sewer system shall be capped and lines filled with water to the top of the highest vent, 10 feet above grade minimum. This test shall be made before any fixtures are installed. Test shall be maintained until all joints have been inspected, but no less than 2 hours.
 - 2. Condensate Piping: Maintain 15 psig water pressure for a duration of 4 hours.

- C. Pressure Systems:
 - 1. General: There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made. Test the new sections or branches of piping only.
 - 2. Domestic Tempered, Cold Water Piping: Maintain 60 psig water pressure for a minimum duration of 2 hours.

- D. Accessible Lavatories:
 - 1. Faucet controls and operating mechanisms shall be installed and tested to comply per CBC Section 11B-606.4.

3.6 DISINFECTION

- A. Disinfect all domestic hot and cold water piping systems in accordance with California Plumbing Code Sections 609.9.1 through 609.9.4. The method to be followed shall be that prescribed by the Health Authority or, in case no method is prescribed by it, the following:
 - 1. The pipe system shall be flushed with clean, potable water until potable water appears at the points of outlet.
 - 2. The system or parts thereof shall be filled with a water-chlorine solution containing not less than 50 parts per million of chlorine, and the system or part thereof shall be valved-off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water-chlorine solution containing not less than 200 parts per million of chlorine and allowed to stand for 3 hours.
 - 3. Following the allowed standing time, the system shall be flushed with clean, potable water until the chlorine residual in the water coming from the system does not exceed the chlorine residual in the flushing water.
 - 4. The procedure shall be repeated where it is shown by bacteriological examination made by an approved agency that contamination persists in the system.

- B. Disinfection process shall be performed by certified testing agency or in cooperation with health department having jurisdiction and witnessed by a representative of the Architect. During procedure, signs shall be posted at each water outlet stating, "Chlorination - Do Not Drink". After disinfection, water samples shall be collected by certified testing agency or by health department for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained and delivered to the Owner through the Owner's Representative.

END OF SECTION 22 00 01

SECTION 26 01 00 ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Description:
 - 1. Provide all labor, materials, tools and equipment necessary for the complete in-place installation of all electrical items complete as shown on drawings and as specified in this Division:
 - a. Complete lighting throughout buildings as indicated to include exterior site including lamps, switching and automatic controls and replacement of existing interior lighting and controls as indicated.
 - b. Complete new power distribution throughout project including main electrical service, distribution panelboards, branch circuit panelboards, conduit, wire, pull boxes, junction boxes and miscellaneous materials.
 - c. Complete receptacle branch circuits including conduit, wire, outlet boxes and devices.
 - d. Electrical connections to equipment furnished and installed under other sections.
 - e. As-built drawings.
 - f. Comply with Cal OSHA Safety Order Title 8.
- B. Codes and Standards:
 - 1. Work and materials shall be in full accordance with California Occupational Safety Health Act (CAL-OSHA), California Electrical Code (CEC), State Fire Marshal, Title 8, Safety Orders of Division of Industrial Safety (ESO), the National Fire Protection Association, California Building Code (CBC); California Code of Regulations - Title 24 and other applicable laws or regulations. Nothing in the Drawings or Specifications shall be construed to permit work not conforming to these codes.
 - 2. When Contract Documents differ from governing codes, furnish and install larger size or higher standards called for without extra charge.

1.3 SUBMITTALS

- A. Submit product data, shop drawings, manufacturer's installation instructions for all electrical equipment and materials in accordance with Division 01: General Requirements.
- B. Provide submittals and M&O manuals prior to close out.

1.4 RECORD DRAWINGS

- A. Upon completion of Work, furnish Engineer with complete sets of current and accurate plans.
 - 1. Show all buried and concealed conduit, stub-outs, etc. Locate all buried conduit and stub-outs by dimensions from permanent, easily located and identifiable portions of structure; also, dimension ends of stub-outs, etc. Note depth of buried items below grade.

1.5 LOCAL CONDITIONS

- A. Examine site; verify dimensions and locations against drawings. No allowance will be made for extra expenses because of omission on Contractor's part to include cost of work under prevailing conditions.
- B. Information shown relative to services is based upon available records and data shall be regarded as approximate only. Minor deviations found necessary to conform with actual locations and conditions shall be made without extra cost.
- C. Contractor is responsible for any damage caused by contractor's work.

1.6 INSPECTIONS

- A. Arrange for required inspections and secure approvals from authorities having jurisdiction.

PART 2 PRODUCTS

- A. All material shall be new, full weight and standard in all respects and in first-class conditions. Where possible, all materials used shall be of the same brand or manufacturer throughout for each class of material or equipment.

PART 3 EXECUTION

3.1 DRAWINGS AND COORDINATION

- A. Work shall be neatly installed in a workmanlike manner in accordance with NECA Standard of Installation. Work shall be coordinated with other trades to avoid conflicts. Clarifications will be made by Engineer and minor adjustments shall be made without additional cost to Owner.
- B. Layouts of equipment, accessories and wiring systems are diagrammatic (not pictorial), but shall be followed as closely as possible.

3.2 CARE AND CLEANING

- A. All broken, damaged or otherwise defective parts shall be repaired or replaced without additional cost to Owner.
- B. All surplus materials and debris resulting from this work shall be cleaned out and removed from site; this includes surplus excavated material.

3.3 EXCAVATING AND BACKFILLING

- A. Excavate and backfill as required for installation of electrical work. Restore all surfaces, roadways, sod, walks, curbs, walls, existing underground installation, etc., cut by installations to original condition in an acceptable manner.

3.4 EQUIPMENT IDENTIFICATION

- A. Provide screwed-on engraved nameplates of black lamicooid with 3/4 inch high white lettering for main switchboards (including each breaker and switch), all panelboards, transformers, all relays, timers, terminal cabinets (including each section) and all special panels and consoles.
- B. Provide identifying numbers for each breaker in all lighting and appliance panelboards in a

permanently attached (not pasted on) directory with plexiglass cover with typewritten identification of each circuit.

- C. Provide screwed-on engraved nameplates of black lamicaid with white 1/2 inch high lettering, identifying function, for all disconnect switches and starters.
- D. Provide labels at each end of each pull cord for all empty conduits/raceways.
- E. Provide 1/4 inch high white lettering labels for all receptacles to identify panel and circuit number.

3.5 TEST

- A. Test all wiring and connections for continuity and grounds; where such test indicate faulty insulation or other defects, locate, repair and retest. Balance loads at panelboards. Furnish all testing equipment.

3.6 CLOSING OF UNINSPECTED WORK

- A. Do not allow or cause any of work installed hereunder to be covered up or enclosed before it has been inspected and approved.
- B. Should any work be enclosed or covered up before it has been approved, uncover such work and after it has been inspected and approved, make all repairs necessary to restore work of others to conditions in which it was found at time of cutting, all without additional cost to Owner.

3.7 ELECTRICAL SYSTEM SHUTDOWN

- A. Provide District with minimum of 10 working days' notice prior to any contemplated shutdown or connection to existing facilities, the contractor shall submit for review their work procedures, which shall include the contractor's lockout/tagout procedures.
- B. A minimum of 2 working days before any shutdown of existing systems, a meeting shall be held to discuss the Contractor's shutdown procedures with the IOR, Construction Manager and the District.

3.8 WARRANTY

- A. See General Conditions for warranty requirements. All items to have a minimum of 2-years warranty.

3.9 PAINTING

- A. All painting is to be performed by General Prime contractor per section 09 90 00.

END OF SECTION 26 01 00

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

CONDITIONS OF THE CONTRACT AND DIVISION 01, as applicable, apply to this Section.

PART 1 GENERAL

1.1 SUMMARY

- A. Provide all work for electrical systems required in the project to be properly installed, tested, and performing their intended function.

1.2 QUALITY ASSURANCE

- A. Perform all work in accordance with the 2022 edition of the California Electrical Code, and local codes.
- B. All electrical materials and distribution, and utilization equipment shall be UL Listed.
- C. All equipment and materials shall be new and unused and of United States Domestic manufacture unless approved otherwise by engineer or owner.
- D. Eliminate any abnormal sources of noise that are considered by the architect not to be an inherent part of the electrical systems as designed.

1.3 COORDINATION WITH OTHER TRADES

- A. Coordinate the work of this division with all other divisions to ensure that all components of the electrical system will be installed at the proper time and fit the available space.
- B. Locate and size all openings in work of other trades required for the proper installation of the electrical system components.
- C. Make all electrical connections to all equipment furnished by this division and any other division.
- D. Make all electrical connections from all 120 volt and greater dampers and switches to associated exhaust fan(s) furnished by any other division.

1.4 DRAWINGS

- A. The drawings are schematic in nature but show the various components of the systems approximately to scale and attempt to indicate how they are to be integrated with other parts of the building. Determine exact locations by review of equipment manufacturer's data, by job site measurements, by checking the requirements of other trades, and by reviewing all Contract Documents. The size of the electrical equipment indicated on the Drawings may be based on the dimensions of a particular manufacturer. While other listed manufacturers will be acceptable, it is the responsibility of the Contractor to determine if the equipment that Contractor proposes to furnish will fit in the space. The drawings are not intended to show exact locations of conduit and wire, or to indicate all wire terminators, connectors, conduit fittings, boxes or supports, but rather to indicate distribution, circuitry, and control.
- B. The Electrical Drawings are necessarily diagrammatic in character and cannot show every connection in detail or conduit in its exact location. These details are subject to the requirements of ordinances and also structural and architectural conditions. The Contractor

shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases and suspended ceilings, etc., in finished portions of the building, unless specifically noted to be exposed. Work shall be installed to avoid crippling of structural members. All exposed work shall be installed parallel or perpendicular to the lines of the building unless otherwise noted.

- C. When the mechanical and electrical Drawings do not give exact details as to the elevation of pipe, conduit, and ducts, physically arrange the systems to fit in the space available at the elevations intended with the proper grades for the functioning of the system involved. Exposed conduit is generally intended to be installed true and square to the building construction and located as high as possible against the structure in a neat and workmanlike manner. The Drawings do not show all required offsets and their location details. Work shall be concealed in all finished areas.

1.5 SUBMITTALS

- A. Specification Review:
 - 1. Include a paragraph-by-paragraph written specification review for each product listed requiring a submittal. Denote any proposed deviations from specifications.

1.6 EXISTING CONDITIONS

- A. Do all work required to maintain electrical services to the Owner occupied portions of the building during construction.
- B. No connection to existing services or utilities shall be made without Owner's knowledge and permission. All such connections shall be planned and scheduled to minimize the length of service interruption required. Request for shutdown shall be made to Owner at least two (2) weeks in advance and shall be accompanied by detailed written schedule of activities during shutdown and list of materials required for connection and renewal of service. It shall be understood that all such service interruptions shall be made at the Owner's convenience, not the Contractor's. No increase in contract amount will be allowed for reasons of premium time, inefficiency of operations or other considerations not calculated in original bid.
- C. All items removed shall be stored on-site. Schedule a review of the items with the Owner. Remove from site all items the Owner does not choose to keep. Deliver Owner designated items to Owner's storage facility.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- B. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.
- C. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

PART 2 EXECUTION

2.1 EXISTING WORK

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

- B. Provide temporary wiring and connections to maintain existing systems in service during construction.
- C. When performing work on energized equipment or circuits, use personnel experienced and trained in similar operations.
- D. Remove, relocate, and extend existing installations to accommodate new construction.
- E. Repair adjacent construction and finishes damaged during demolition and extension work.

2.2 OWNER INSTRUCTION

- A. Provide on-site Owner training for all new equipment.
- B. Use Operation and Maintenance manuals and actual equipment installed as basis for instruction.
- C. At conclusion of on-site training program have Owner personnel sign written certification they have completed training and understand equipment operation. Include copy of training certificates in final Operation and Maintenance manual submission.
- D. Supply record drawings to the district in PDF and the latest version of AutoCAD.

END OF SECTION 26 05 00

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section

1.2 SUMMARY

- A. Section includes:
 - 1. Wires and cables rated for 600 volts or less.
 - 2. Connectors, splices, and terminations rated for 600 volts or less.
 - 3. Lugs and pads rated for 600 volts or less.
- B. System Description:
 - 1. Provide wires, cables, connectors, lugs, strain reliefs, racking insulators for a complete and operational electrical system.
- C. Reference Standards:
 - 1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
 - 2. National Electrical Manufacturers Association (NEMA):
 - a. WC 70 Power Cables Rated 2,000 V or Less for the Distribution of Electrical Energy.
 - 3. National Electrical Testing Association (NETA):
 - a. ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
 - 4. Underwriters Laboratories, Inc. (UL):
 - a. 83 UL Standard for Safety Thermoplastic-Insulated Wires and Cables.
 - b. 486 Standard for Wire Connectors.
 - 5. American Society for Testing and Materials (ASTM):
 - a. B1 Standard Specification for Hard-Drawn Copper Wire.
 - b. B3 Standard Specification for Soft or Annealed Copper Wire.
 - c. B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

1.3 SUBMITTALS

- A. Provide product data for the following equipment:
 - 1. Wires.
 - 2. Cables.
 - 3. Connectors.
 - 4. Lugs.
 - 5. Splice Kits.
- B. Provide the insulation cable testing report in the project closeout documentation, refer to Closeout Requirements in the General Conditions portion of this specification.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Confirm to requirements of the CEC, latest adopted version with amendments by local

- Authority Having Jurisdiction (AHJ).
2. Furnish products listed by UL or other testing firm acceptable to AHJ.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wires and Cables:
 1. Southwire Company
 2. Encore Wire Corporation
 3. Cerro Wire and Cable Co.
 4. General Cable Corp.; a brand of Prysmian Group
 5. Okonite Co.
 6. Alan Wire
 7. LS Cable and System USA
 8. American Wire and Cable

- B. Connectors:
 1. FCI Burndy Corp.
 2. Cooper Crouse Hinds.
 3. O.Z./ Gedney Co.
 4. Thomas & Betts Co.
 5. 3-M Co.
 6. Ideal Industries Co.
 7. Polaris Electrical Connectors
 8. ILSCO

- C. Wire connectors shall be minimum 75 degree centigrade rated and properly sized for the number of conductors being connected, terminated, spliced etc. All above grade connectors shall be solderless lug or plastic wire nut type, screw on, pressure cable type (wire nut or spring nut type), 600 Volt, 105-degree C, with skirt to cover all portions of stripped wires. Connector shall be U.L. rated for number and size of conductors being joined together as a splice.

- D. Splices:
 1. Branch Circuit Splices: Ideal, Scotch-Lock, 3M, or approved.
 2. Feeder Splices: Compression barrel splice with two layers Scotch 23 and four layers of Scotch 33+ as vapor barrier.
 3. Screw Terminal Lugs.
 4. Kearney Split Bolt.

2.2 WIRES AND CABLES FOR LINE VOLTAGE SYSTEM AND CONTROLS.

- A. Wire and Cable Shall Be:
 1. Copper, 600 volt rated throughout. Conductors 12AWG to 10AWG, solid or stranded. Conductors 8AWG and larger, stranded.
 2. Phase color to be consistent at all feeder terminations; A-B-C, top to bottom, left to right, front to back. Phasing tape shall be permitted on sizes #6 and larger.

- B. Each phase wire shall be uniquely color-coded as indicated below:
 1. 120/ 240 Volts
Phase A – Black
Phase B – Red
Neutral – White
Ground – Green

2. 120/ 208 Volts
Phase A – Black
Phase B – Red
Phase C – Blue
Neutral – White
Ground – Green
 3. 277/ 480 Volts
Phase A – Brown
Phase B – Orange
Phase C – Yellow
Neutral – White or Natural Gray
Ground – Green
 4. Isolated Grounds: Green with Yellow Stripes
- C. All conductors shall be copper unless otherwise noted. Minimum size for individual conductors shall be #12 AWG unless otherwise noted. Sizes #8 AWG and larger shall be stranded conductor. Individual conductors shall be insulated with type, XHHW, THW, THHN/ THWN 600- volt insulation unless otherwise noted. Control, signal, communication conductors shall be as dictated by the vendor of that equipment or as specified here-in. Proper insulation type shall be used for the proper environmental application (i.e., waterproof, wet location, plenum, temperature rated). If a condition exists where the application is uncertain, contact the Engineer for direction. Contractor is responsible to follow specific cabling requirements described in other sections of this specification relative to various communications and controls systems as well as the respective riser diagrams shown on plans. If a discrepancy occurs, communicate such discrepancy to the Architect and Engineer immediately for resolution.
- D. Insulation types THWN, THHN or XHHW. Minimum insulation rating of 90C for branch circuits.
- E. Refer to signal and communications specification sections for cable requirements.

2.3 CONNECTORS

- A. Copper Pads: Drilled and tapped for multiple conductor terminals.
- B. Lugs: Indent/ compression type for use with stranded branch circuit or control conductors.
- C. Solid Conductor Branch Circuits: Spring connectors, wire nuts, for conductors 12 through 8AWG.

2.4 LUGS AND PADS

- A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Installation: Conductors shall not be installed until after conduit systems are permanently in place. Use an approved non-hardening type wire pulling lubricant if lubricant is to be used. Maintain all conduits and wire pulls free from foreign material. If due to field conditions, more than a total of 300 degrees of bend are required; a pull box shall be furnished and installed for ease of installation. Said pull boxes must be sized and rated for the appropriate

application and must remain easily accessible upon completion of the project (approval of the location shall be obtained from the Architect prior to installation). Show these pullboxes on the field record drawings. Conductors installed in underground raceways on site shall be duct sealed and taped where they exit the raceway to prevent the entrance of foreign material and moisture after the conductors are installed. Proper drainage shall be provided for underground pull and splice boxes.

- B. Insulation: Use proper insulation types where temperature and environment are a factor.
- C. Labeling: All conductors in panels, switchboards, terminal cabinets, vaults, pull boxes, and junction boxes shall be labeled with tape number markers indicating circuit number and identifying system. All labeling shall be permanent. See Section 26 05 53: Identification of Electrical Systems.
- D. All conductors, wiring, cable where installed below floor, slab or underground shall be considered wet locations, and shall be rated accordingly. Non-waterproof cabling is not allowed in any below grade or wet application.
- E. Cables routed together in cable tray shall be stacked, organized and tie wrapped together in a neat and workman like manner. Random cable routing is not acceptable.
- F. Cable and conductors routed through pull boxes and vaults shall be properly supported. Bend radius of cable or conductor shall not be less than six times the overall cable diameter.
- G. Wires and Cables:
 - 1. Conductor Installation:
 - a. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
 - b. Install conductors with care to avoid damage to insulation.
 - c. Do not apply greater tension on conductors than recommended by manufacturer during installation.
 - d. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation.
 - 2. Conductor Size and Quantity:
 - a. Install no conductors smaller than 12AWG unless otherwise shown (e.g. – Fire alarm and communications systems, as defined in their respective specifications sections and/ or drawings).
 - b. Provide all required conductors for a fully operable system.
 - 3. Provide dedicated neutrals (one neutral conductor for each phase conductor). Exceptions may only be granted with Electrical Engineer approval.
 - 4. Conductors in Cabinets:
 - a. Cable and train all wires in panels and cabinets for power and control neatly and uniformly. Use plastic ties in panels and cabinets.
 - b. Tie and bundle feeder conductors in wireways of panelboards.
 - c. Hold conductors away from sharp metal edges.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and test shall be performed under provisions of NETA ATS section 7.3 (2) - Low Voltage Cables, 600-Volt Maximum as follows:
 - 1. Visual and Mechanical Inspection:
 - a. Compare cable data with drawings and specifications.
 - b. Inspect exposed sections of cable for physical damage and correct connection in accordance with single-line diagram.
 - c. Inspect all bolted electrical connections for high resistance using one of the following methods:

- 1) Use of low-resistance ohm-meter in accordance with NETA section 7.3.2.2 (Electrical Tests).
- 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data from NETA ATS Table 10.12.
- d. Inspect compression-applied connectors for correct cable match and indentation.
- e. Verify cable color coding with applicable specifications and CEC.
2. Electrical Tests
 - a. Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute.
 - b. Perform resistance measurements through all bolted connections with low-resistance ohmmeter, if applicable, in accordance with Section 7.3.2.1 (Visual and Mechanical Inspection).
 - c. Perform continuity test to insure correct cable connection.
 - d. Correct malfunctions and/ or deficiencies immediately as detected at no additional cost to the District, including additional verification testing.
 - e. Subsequent to final wire and cable terminations, energize all circuitry and demonstrate functional adequacy in accordance with system requirements.
3. Test Values
 - a. Compare bolted connection resistance to values of similar connections.
 - b. Bolt-torque levels should be in accordance with NETA ATS Table 10.12 unless otherwise specified by the manufacturer.
 - c. Micro-ohm or milli-volt drop values shall not exceed the high levels of the normal range as indicated in the manufacturer's published data. If manufacturer's data is not available, investigate any values which deviate from similar connections by more than 50 percent of the lowest value.
 - d. Minimum insulation-resistance values should not be less than 50 meg-ohms.
 - e. Investigate deviations between adjacent phases.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section Includes:
 - 1. Grounding and bonding requirements of electrical installations for personnel safety and to provide a low impedance path for possible ground fault currents as described in CEC Article 250.
 - 2. "Grounding electrode system" refers to all electrodes required by CEC, as well as including made, supplementary, lightning protection system and telecommunications system grounding electrodes.
 - 3. The terms "connect" and "bond" are used interchangeably in this specification and have the same meaning.
- B. Related Sections:
 - 1. Section 26 05 00: Common Work Results for Electrical.
 - 2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
- C. Reference Standards:
 - 1. California Electrical Code (CEC) based on NFPA 70. California Code of Regulations, Title 24, Part 3.
 - 2. Institute of Electrical and Electronics Engineers (IEEE):
 - a. 81 IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.
 - b. 142 Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - c. 1100 Recommended Practice for Powering and Grounding Electronic Equipment
 - 3. National Electrical Testing Association (NETA):
 - a. ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems
 - 4. Underwriters Laboratories, Inc. (UL):
 - a. 83 UL Standard for Safety Thermoplastic-Insulated Wires and Cables.
 - b. 467 Grounding and Bonding Equipment.
 - 5. American Society for Testing and Materials (ASTM):
 - a. B1 Standard Specification for Hard-Drawn Copper Wire.
 - b. B3 Standard Specification for Soft or Annealed Copper Wire.
 - c. B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

- A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes No. 10 AWG and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be permitted to be identified per CEC.

- B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes No. 10 AWG and smaller shall be ASTM B1 solid bare copper wire.
- C. Conductor sizes shall not be less than what is shown on the drawings and not less than required by the CEC, whichever is greater.

2.2 SPLICES AND TERMINATION COMPONENTS

- A. Components shall meet or exceed UL 467 and be clearly marked with the manufacturer, catalog number, and permitted conductor size(s).

PART 3 EXECUTION

3.1 GENERAL

- A. Ground in accordance with the CEC, as shown on drawings, and as hereinafter specified.
- B. System Grounding:
 - 1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
 - 2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.
- C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, fire sprinklers, plumbing piping, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.

3.2 INACCESSIBLE GROUNDING CONNECTIONS

- A. Make grounding connections which are buried or otherwise normally inaccessible (except connections for which periodic testing access is required) by exothermic weld.

3.3 SECONDARY EQUIPMENT AND CIRCUITS

- A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.
- B. Metallic Piping, Building Steel, and Supplemental Electrode(s):
 - 1. Provide a grounding electrode conductor sized per CEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
 - 2. Provide a supplemental ground electrode and bond to the grounding electrode system.
- C. Service Disconnect: Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.
- D. Switchgear, Switchboards, and Motor Control Centers:
 - 1. Connect the various feeder equipment grounding conductors to the ground bus in the enclosure with suitable pressure connectors.
 - 2. For service entrance equipment, connect the grounding electrode conductor to the ground bus.
 - 3. Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and grounding conductor to the equipment ground

bus.

- E. Transformers:
 - 1. Exterior: Exterior transformers supplying interior service equipment shall have the neutral grounded at the transformer secondary. Provide a grounding electrode at the transformer.
 - 2. Separately derived systems (transformers downstream from service equipment): Ground the secondary neutral at the transformer. Provide a grounding electrode conductor from bar at the service equipment.
- F. Conduit Systems:
 - 1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor sized per CEC.
 - 2. Nonmetallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
 - 3. Metal conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.
- G. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders, power, and lighting branch circuits.
- H. Boxes, Cabinets, Enclosures, and Panelboards:
 - 1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes.
 - 2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
 - 3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.
- I. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.
- J. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.
- K. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.
- L. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.

3.4 CONDUCTIVE PIPING

- A. Bond all conductive piping systems, interior and exterior, to the building to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.

3.5 TELECOMMUNICATIONS SYSTEM

- A. Bond telecommunications system grounding equipment to the electrical grounding electrode

system. Refer to communications backbone cabling specification section.

3.6 GROUND RESISTANCE

- A. Grounding system resistance to ground shall not exceed 15 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost to the Owner. Final tests shall assure that this requirement is met, and test results shall be submitted to the Owner with final close out documents.
- B. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE Standard 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.
- C. Below-grade connections shall be visually inspected by the Inspector of Record (IOR) prior to backfilling. The Contractor shall notify the IOR 24 hours before the connections are ready for inspection.
- D. Furnish a copy of tests to Owner at completion of project.

END OF SECTION 26 05 26

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

CONDITIONS OF THE CONTRACT AND DIVISION 01, as applicable, apply to this Section.

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Conduit supports.
 - 2. Formed steel channel.
 - 3. Spring steel clips.
 - 4. Sleeves.
 - 5. Mechanical sleeve seals.
 - 6. Firestopping relating to electrical work.
 - 7. Firestopping accessories.
 - 8. Equipment bases and supports.

1.2 REFERENCES

- A. Underwriters Laboratories Inc.:
 - 1. UL 263 - Fire Tests of Building Construction and Materials.
 - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
 - 3. UL 1479 - Fire Tests of Through-Penetration Firestops.
 - 4. UL - Fire Resistance Directory.

1.3 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 PERFORMANCE REQUIREMENTS

- A. Firestopping: Conform to Building Code and UL for fire resistance ratings and surface burning characteristics.

1.5 SUBMITTALS

- A. Product Data:
 - 1. Hangers and Supports: Submit manufacturers catalog data including load capacity.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with the Building Code.

PART 2 PRODUCTS

2.1 CONDUIT SUPPORTS

- A. Manufacturers:
 - 1. Allied Tube & Conduit Corp.
 - 2. Electroline Manufacturing Company.

3. O-Z Gedney Co.
 4. Appleton.
- B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.
- C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.
- D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.
- E. Conduit clamps - general purpose: One hole malleable iron for surface mounted conduits.
- F. Cable Ties: High strength nylon temperature rated to 185 degrees F. Self-locking. With Stainless tooth.

2.2 FORMED STEEL CHANNEL

- A. Manufacturers:
1. Allied Tube & Conduit Corp.
 2. B-Line Systems.
 3. Midland Ross Corporation, Electrical Products Division.
 4. Unistrut Corp.
- B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

2.3 SLEEVES

- A. Sleeves for raceway Through Non-fire Rated Floors: 18 gage galvanized steel.
- B. Sleeves for raceway Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage galvanized steel.
- C. Sleeves for raceway Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL Listed.
- D. Fire-stopping Insulation: Glass fiber type, non-combustible.

2.4 SPRING STEEL CLIPS

- A. Product Description: Mounting clamp, and screw.

2.5 MECHANICAL SLEEVE SEALS

- A. Manufacturers:
1. Thunderline Link-Seal, Inc.
 2. NMP Corporation.
- B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.6 FIRESTOPPING

- A. Manufacturers:
 - 1. Dow Corning Corp.
 - 2. Fire Trak Corp.
 - 3. Hilti Corp.
 - 4. International Protective Coating Corp.
 - 5. 3M fire Protection Products.
 - 6. Specified Technology, Inc.

- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
 - 1. Silicone Firestopping Elastomeric Firestopping: Multiple component silicone elastomeric compound and compatible silicone sealant.
 - 2. Foam Firestopping Compounds: Multiple component foam compound.
 - 3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
 - 4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
 - 5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
 - 6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
 - 7. Firestop Pillows: Formed mineral fiber pillows.

2.7 FIRESTOPPING ACCESSORIES

- A. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

- B. General:
 - 1. Furnish UL Listed products.
 - 2. Select products with rating not less than rating of wall or floor being penetrated.

- C. Non-Rated Surfaces:
 - 1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
 - 2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive sleeves.

- B. Verify openings are ready to receive firestopping.

3.2 INSTALLATION - HANGERS AND SUPPORTS

- A. Anchors and Fasteners:
 - 1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder actuated anchors or preset inserts as required.
 - 2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset

- fasteners or welded fasteners as required.
 - 3. Concrete Surfaces: Provide self-drilling anchors and expansion anchors as required.
 - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts or hollow wall fasteners as required.
 - 5. Solid Masonry Walls: Provide expansion anchors or preset inserts as required.
 - 6. Sheet Metal: Provide sheet metal screws.
 - 7. Wood Elements: Provide wood screws.
- B. Inserts:
- 1. Install inserts for placement in concrete forms.
 - 2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over four (4) inches.
 - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
 - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.
- C. Install conduit and raceway support and spacing in accordance with CEC.
- D. Do not fasten supports to suspended ceiling support system, pipes, ducts, mechanical equipment, or conduit.
- E. Install multiple conduit runs on common hangers.
- F. Supports:
- 1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
 - 2. Install surface mounted cabinets and panelboards with minimum of four anchors.
 - 3. In wet and damp locations install steel channel supports to stand cabinets and panelboards one (1) inch off wall.
 - 4. Support vertical conduit at every floor.

3.3 INSTALLATION - FIRESTOPPING

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit, and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.
- D. Compress fibered material to maximum 40 percent of its uncompressed size.
- E. Place intumescent coating in sufficient coats to achieve rating required.
- F. Remove dam material after firestopping material has cured.
- G. Fire Rated Surface:
 - 1. Seal opening at all rated floors and walls as follows:
 - a. Install sleeve through opening and extending beyond minimum of one (1) inch on both sides of building element.
 - b. Size sleeve allowing minimum of one (1) inch void between sleeve and building

- element.
 - c. Pack void with backing material.
 - d. Seal ends of sleeve with UL Listed fire resistive silicone compound to meet fire rating of structure penetrated.
 - 2. Where cable tray, bus, or conduit, penetrates fire rated surface, install firestopping product ins accordance with manufacturer's instructions.
- H. Non-Rated Surfaces:
- 1. Seal opening through non-fire rated floors and walls as follows:
 - a. Install sleeve through opening and extending beyond minimum of one (1) inch on both sides of building element.
 - b. Size sleeve allowing minimum of one (1) inch void between sleeve and building element.
 - c. Install type of firestopping material recommended by manufacturer.
 - 2. Install escutcheons where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
 - 3. Exterior wall openings below grade: Assemble rubber links of mechanical seal to size of conduit and tighten in place, in accordance with manufacturer's instructions.

3.4 INSTALLATION - SLEEVES

- A. Exterior watertight entries: Provide mechanical sleeve seals.
- B. Interior conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.
- C. Set sleeves in position in forms. Provide reinforcing around sleeves.
- D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- E. Extend sleeves through floors and walls one (1) inch above finished floor level. Caulk sleeves.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Conduit and fittings.
 2. Outlet boxes.
 3. Weatherproof outlet boxes.
 4. Junction and pull boxes.
 5. Floor boxes.
 6. Cabinets, termination cabinets.
 7. Gutters.

1.3 SUBMITTALS

- A. Provide Product Data for the Following Equipment:
1. Conduit and fittings.
 2. Outlet boxes.
 3. Weatherproof outlet boxes.
 4. Junction and pull boxes.
 5. Floor boxes.
 6. Cabinets, termination cabinets.
 7. Gutters.
 8. Putty pads.
 9. Raceways
- B. Submit detailed conduit routing plan, for review and approval, prior to installation as follows:
1. Exposed and/ or concealed in building walls for conduits larger than 2-inch outside diameter.
 2. All underground conduits (3/4-inch and larger) in duct bank; concealed in floor slabs, equipment pads and concrete slabs.

1.4 SUBMITTALS

- A. Minimum acceptable conduit sizes are summarized in the following table:

	Minimum Size
Underground, site wiring	1"
Underground <ul style="list-style-type: none">• Building Wiring Aboveground <ul style="list-style-type: none">• Equipment or panel feeders• Telecommunications	3/4"
Aboveground <ul style="list-style-type: none">• Lighting or branch circuit wiring• Fire alarm• Security	1/2"

Other	3/4"
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1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Conform to requirements of the CEC, latest adopted version with amendments by local AHJs.
 - 2. Furnish products listed by UL or other independent and nationally recognized testing firm.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- B. Protect PVC and PVC-coated metallic conduit from sunlight.
- C. Protection of and cleanliness of pathways and raceways must be assured during the construction process in order to eliminate the possibility of debris entering the conduit, duct, pathway resulting in decreased wire capacity and potential damage to installed conductors and cables.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Polyvinyl Chloride (PVC) coated galvanized rigid steel conduit and intermediate metal conduit shall be in accordance with NEMA RN 1. Coating shall be applied under controlled factory conditions. Prior to coating, conduit shall meet requirements of ANSI C80.1 and UL 6 or ANSI C80.6 and UL 1242 as appropriate. PVC coated conduits shall have ultra-violet (UV) inhibitor in the coating material.
- B. Intermediate Metal Conduit (IMC). Raceway shall be hot dipped galvanized mild steel in accordance with ANSI C80.6 and UL 1242 and shall bear the UL label. Conduit shall have same characteristics of rigid steel except for thinner wall.
- C. Galvanized Rigid Steel Conduit (GRSC or RGS), couplings and elbows shall be hot dip galvanized, rigid mild steel in accordance with ANSI C80.1 and UL 6. The conduit interior and exterior surfaces shall have a continuous zinc coating with a transparent overcoat of enamel, lacquer, or zinc chromate. Conduit shall be formed with continuous welded seams with a uniform wall thickness, in minimum 10-foot lengths, with threaded ends.
- D. Electrical Metallic Tubing (EMT). Electrical metallic tubing, including elbows and bends, shall be zinc coated, mild steel in accordance with the requirements of ANSI C80.3 and UL 797. The interior and exterior surfaces of the tubing shall have a continuous zinc coating. Conduit shall be formed with a continuous welded seam, with a uniform wall thickness, in minimum 10-foot lengths.
- E. Non-Metallic Conduit shall be as follows:
 - 1. Schedule 40: Conduit shall be 90 degree Celsius, polyvinyl chloride in conformance with NEMA TC-2 and UL 651 requirements.
 - 2. Spacers used in duct bank installations shall be high impact plastic, interlocking bases, and intermediate type spacers. Place spacers between 6 and 10 feet apart.

- F. Flexible Metal Conduit shall be galvanized steel meeting the requirements of UL 1. Flexible aluminum conduit is not permitted.
- G. Liquid-Tight Flexible Metal Conduit shall be plastic jacketed, galvanized steel, "Sealtite" Type EF for general service areas or Type HC for high temperature when used under raised floor or in air plenums. Conduit shall be UL listed.
- H. Manufacturers:
 - 1. Outlet Boxes: Bowers, Raco, Orbit, Steel City or equal.
 - 2. Weatherproof Outlet Boxes: Bell, Red Dot, Carlon or equal.
 - 3. Floor Boxes: Wiremold/ Walker, Hubbell, Steel City, or equal.
 - 4. Junction and Pull Boxes: Circle AW, Hoffman, Wireguard or equal.
 - 5. Box Extension Adapter: Bell, Red Dot, Carlon or equal.
 - 6. Conduit Fittings: O-Z Gedney, Thomas & Betts, Raco, Crouse Hinds, or equal.
 - 7. Putty pads: 3M, Hilti, or equal.
 - 8. Heavy wall rigid non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
 - 9. Extra heavy wall non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
 - 10. Flexible Metal Conduit (FMC), Alflex, American Flexible Conduit or equal.
 - 11. Liquid tight flexible metal conduit, Anacanda (type UA), Electri-flex Liguatite or equal.
 - 12. Floor Boxes, Single Gang, Walker/ Wiremold 880 CS Series or approved equal.
 - 13. Floor Boxes, Multiple Gang, Walker/ Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/ or water resistant device covers.
 - 14. Masonry Boxes, outlets in concrete, Raco Series 690 or equal.
- I. Listed products for termination, coupling, extending, benching supports of raceways shall be used.

2.2 OUTLET BOXES

- A. NEMA 1 gutter, junction and pull boxes shall be fabricated from code gage steel finished in grey enamel with screw cover fronts and concentric knockouts in all sides.
- B. NEMA 3R gutter, junction and pull boxes shall be fabricated from code gage galvanized steel with screw cover fronts and concentric knockouts in the bottom only. Any penetrations to the side, top or back shall be weatherproofed in an approved manner such as "MYERS" gasketed type hub or equal.
- C. Steel outlet boxes and plaster rings shall be galvanized rigid assemblies, either one piece pressed or factory welded construction containing the size and number of knockouts required. Steel outlet boxes shall be manufactured, sized and installed in accordance with CECArticle 314. Device Outlet: Installation of one or two devices at common location, minimum 4" square, minimum 1-1/2" deep. Single or 2 gang flush device plaster ring. Raco or equal.
- D. Luminaire Outlet: minimum 4" square with correct plaster ring depth, minimum 1-1/2" deep with 3/8" luminaire stud if required. Provide proper depth plaster ring on bracket outlets and on ceiling outlets.
- E. Construction: Provide galvanized steel interior outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Boxes shall be properly secured to the structure such that they are flush with the finish surface. Boxes shall be made structurally secure by means of the proper fastening devices.

- F. Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, plaster rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.

2.3 JUNCTION AND PULL BOXES

- A. Construction: Provide galvanized sheet steel junction and pull boxes, with screw-on covers; of the type shape and size, to suit each respective location and installation; with welded seams and equipped with steel nuts, bolts, screws and washers.
- B. Location:
 - 1. Install junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
 - 2. Install junction boxes and pull boxes as required to facilitate the installation of conductors and limiting the accumulated angular sum of bends between boxes, cabinets and appliances to 300 degrees.
 - 3. Locations: Junction boxes shall be located only where necessary and only in equipment rooms, closets, and accessible attic and underfloor spaces. A horizontal distance of 24" shall separate outlet boxes on opposite sides of occupancy separation walls, fire-rated walls or partitions.
 - 4. Labeling: Junction box covers shall be marked with indelible ink indicated the circuit numbers passing through the box.

2.4 CONDUIT FITTINGS

- A. Requirements: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and plastic conduit bushings of the type and size to suit each respective use and installation.
- B. Steel boxes may allow for field knock-out modifications, but shall in all other ways conform to code requirements.

2.5 FLOOR BOXES - SINGLE GANG

- A. Construction: Deep cast iron fully adjustable before and after concrete pour with all required components for complete activation. Verify required components for application of service fittings, covers, monuments, and the like, attached to floor boxes.
- B. Activations:
 - 1. Flush: Provide brass duplex or single signal cover, hinged with set screw lock. Carpet or tile finish ring.
 - 2. Monuments: Provide stainless steel monuments with power receptacle or data grommet as noted.
 - 3. Coordinate specific application of systems as noted on Drawings.

2.6 FLOOR BOXES - MULTIPLE GANG

- A. Construction: Deep cast iron, fully adjustable before and after pour. Equal to Walker/ Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/ or water resistant device covers. Verify color. Partition for different power or signal applications. Provide required power receptacle devices and signal grommets or receptacles as noted. Flange type shall be compatible with floor covering for either carpet or vinyl as required and shall be brass type not polycarbonate.

- B. Floor mounted boxes shall be water tight and cast iron when installed in grade level concrete slab floor, fully adjustable with interior and exterior leveling screws. Receptacle flange shall be brass with a duplex lift lid. Flange type shall be compatible with floor type. Before installation, coordinate exact location with Architect.

2.7 PUTTY PADS

- A. Intumescent moldable firestop putty designed to protect electrical outlet boxes.
- B. Provide putty pads of proper type around outlet boxes and/ or as detailed on plan to meet sound transmission restrictions and fire ratings of walls

PART 3 EXECUTION

3.1 INSTALLATION

- A. Conduit systems listed below are for use in installations where they are permitted to be used by CEC and/ or other occupancy restrictions. The below installation methods do not intend to suggest that these materials be installed in conflict with any applicable code. Special attention to applications shall be made in building types such as wet location, hazardous locations, assembly occupancy and multi-story, but not limited to these. Requirements which are more restrictive than the CEC may be called for by the drawings and/ or these specifications. These requirements must be adhered to. The Electrical Contractor shall be responsible to use the proper conduit system for the application. Exposed conduit is not allowed below ceilings or above slab of floor, without prior approval from Electrical Engineer. All conduits shall be concealed except in electrical and telecommunication rooms or where shown to be surface mounted. Exposed conduit (where allowed) shall be run square and plumb with building lines in an approved manner. Support roof mount conduits, where allowed, with minimum 12" wide approved rooftop supports (B-Line Durablok or approved equal) unless otherwise detailed in roof requirements or as specified in roofing specification. Strap conduits to blocks with proper sized conduit straps. Spacing of support shall be a minimum as provided for in the CEC. All exposed conduit mounted below 8' above finished grade shall be strapped at a minimum of 5' spacing.
- B. Non-Metallic Rigid Conduit shall be used in concrete slabs, below concrete slabs on grade, or underground outside of a building slab or foundation. Maintain minimum depth requirements and cover with appropriate fill material. Conduit shall be heavy wall Schedule 40 or 80, rigid PVC only. Rigid utility P&C duct shall not be used in any application. Properly sized grounding conductors shall be installed per CEC article 250, in all non-metallic conduit branch circuit and feeder runs. PVC conduit shall be formed or field bent only with the use of properly approved bending tools such as to not decrease the internal bore of the conduit. All conduits shall be cut square and reamed of burrs. Approved and compatible glue shall be used on all PVC fittings to attain watertight joints.
- C. Galvanized Rigid Steel (GRS) conduit shall be used where exposed less than 8'-0" above finished grade to 18" below finished grade and where subject to physical damage. Conduits shall be cut square and reamed to remove burrs and sharp edges. Strap conduit below 8' above grade at 5' intervals. Unless otherwise noted, threadless setscrew and threadless weathertight fittings may be used in lieu of threaded fittings. All threaded ends entering a junction box of any type shall require one locknut on the inside and one on the outside of the enclosure and be provided with a plastic bushing or grounding bushing where necessary for proper grounding. Where exposed to moisture, a watertight hub or other approved method shall be required. All conduits shall be stubbed up straight and uniform into junction boxes, panels, cabinets, etc., and shall be (GRS) properly supported and strapped. All GRS conduit located below grade, shall be tape wrapped.

- D. Electrical Metallic Tubing (EMT) shall be used as allowed by code and as permitted by this specification. It shall not be in contact with soil or the concrete slab on the ground floor of any structure. Connectors and couplings shall be steel insulated set screw type where installed in indoor dry locations not subject to moisture. Where the potential for moisture is present, compression type weathertight fittings are required. One hole conduit straps are permitted from 1/2" to 1" and two hole conduit straps are required for size 1-1/4" and larger. EMT shall not be allowed in areas subject to severe physical damage. Install copper ground wire sized per CEC 250-122 in all EMT conduits.
- E. Flexible conduit may be used where concealed in building construction or above dropped ceilings, but shall meet the following criteria: No individual circuit path from distribution panel to last device shall exceed a cumulative length of 6' of flexible conduit from start to end. Flexible conduit shall not exceed a total directional change of 270 bending degrees in any one run between conduit terminations. Squeeze type or Jake type steel flex fittings of a grounding type are required. Flexible conduit must be supported in accordance with CEC. Where exposed to the weather, moisture, or spray down flexible conduit shall be of the liquidtight type. Fittings shall be manufactured for use with liquidtight flexible conduit. All motor connections shall be made with liquidtight flex. Flexible conduit may not be used where exposed except for last 2' of equipment connection and unless otherwise noted or approved. A copper ground wire sized per CEC 250-122 shall be installed in all flexible conduit runs. Flexible conduit may not be used exposed. Weatherproof liquid tight conduit shall not be used at roof level for equipment connections with lengths exceeding 24" nor shall it be used to circumvent a rigid conduit system in a horizontal direction. Connect recessed lighting fixtures to conduit runs with a maximum of 6' of flexible metal conduit extending from junction box to fixture.
- F. Underground conduits and transition to above grade/ slab shall be as follows:
1. PVC elbows 2" and smaller are allowed, or if top of elbow is minimum 18" BFG or below top of slab, otherwise GRS elbows are required.
 2. GRS risers are required from elbow below grade to equipment (device, outlet, panel, cabinet, etc.) above grade.
 3. GRS elbows/risers to be PVC coated or 10 MIL tape wrapped (1/2" lapped) to 3" above finish grade or top of slab.
- G. Conduit Supports: Conduit runs may be supported by one-hole and two-hole straps or supports as manufactured by Unistrut, Minerallac, Caddy or equals. Supports may be fastened by means of anchors, shields, beam clamps, toggle bolts, or other approved methods appropriate for the application and size of conduit. Pipe nailers (J-hooks) may only be used for 1" conduit and smaller and only in wood frame construction. Conduit support methods are subject to review by the engineer and authority having jurisdiction for adequacy. Installations deemed inadequate shall be corrected by the contractor at no cost to the Owner.
- H. Bends and offsets shall be made with approved tools for the type of conduit being utilized. Bends shall be made without kinking or destroying the smooth bore of the conduit. Parallel conduits shall be run straight and true with bends uniform and symmetrical. Minimum radii shall be per CEC 344-24.
- I. Conduit Stub-outs below grade shall be capped with plastic cap, and identified by placing a pull box marked with correctly identified utility such as "Elec", "Tel", etc. Dimension for exact location on field record drawings. Provide lids for proper field application (i.e. traffic, incidental, pedestrian).
- J. Conduit Seals - Where below grade conduits enter structure through slab or retaining wall of building or basement, seal the inside of each conduit as follows:
1. Provide damming material around conductors 3" into conduit. Polywater or equal.

2. Fill 3" of conduit with 3M #2123 sealing compound.
 3. Wrap conductors where they exit the conduit with 3M #2229 "Scotch Seal" mastic tape. Lap tape to approximate diameter of the raceway and wrap outside of conduit opening with (minimum) one turn.
 4. Use conduit sealing bushings type CSB (O-Z/ Gedney) or equal.
 5. Empty conduits shall be sealed with standard non-hardening duct seal compound and then capped to prevent entrance of moisture and gases and to meet fire resistance requirements.
 6. Provide cable drip loop minimum 12" high.
- K. Marker tape: Place marker tape at 12" below finish grade along and above buried conduits. Label tape "CAUTION: ELECTRICAL LINES BELOW" or similar wording.
- L. Electrical and communications systems raceways routed underground shall not occupy the same trench as plumbing utilities such as sewer, water, storm drain, gas or other wet or dry gaseous utility system. A minimum of 12" of undisturbed earth is required. Where utilities must cross in closer proximity to each other due to physical constraints, 6" minimum crossing distances are allowed.
- M. Conduits, routed below footings, slabs, grade beams, columns, and other structural elements shall be installed in strict compliance with structural details and criteria shown on structural plans. Clearances below structural elements and sleeves through structural elements must be carefully planned to avoid conflict and must be approved by the structural engineer if conflict arises.
- N. All conduit or raceways passing through fire rated walls, floors, or ceilings shall be installed with a listed penetration method which protects the opening to the same rating as the assembly and is non hardening.
- O. Location: Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.
- P. Anchoring: Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.
- Q. Special Application: Provide weatherproof outlets for locations exposed to weather or moisture.
- R. Knockout Closures: Provide knockout closures to cap unused knockout holes where blanks have been removed.
- S. Mount outlet boxes, unless otherwise required by ADA, or noted on drawings, the following distances above the finished floor:
1. Receptacles, Telephone, TV & Data outlets. (measured to bottom of outlet box): +15".
 2. Outlet above counter (measured to top of outlet box): +46".
 3. Control (light) Switches. (measured to top of outlet box): +48".
 4. Fire Alarm Manual Pull Stations, T-stats. (measured to top of outlet box): +48".
 5. Fire Alarm Visuals: the lower of +80" to bottom of lens, or 6" below ceiling.
 6. Other Outlets: As indicated in other sections of specifications or as detailed on drawings.
- T. Coordinate all electrical device locations with the architectural floor plan and interior and exterior elevations to prevent mounting devices within elements that they may conflict such as cabinetry, mirrors, planters, etc.
- U. Size outlet and junction boxes to minimum wire fill space requirements. Upsize box as

required to allow ease of wire installation and device installation.

- V. Outlet and junction boxes in fire rated walls shall be gauged and spaced so as not to exceed the maximum penetration allowed by the assembly without compromising the fire rating. If a conflict arises relative to a specific condition, the contractor shall follow the requirements of the fire authority and ask for guidance from the design team. At no time should a larger box be installed prior to resolution of conflict.

END OF SECTION 26 05 33

SECTION 26 05 53 - IDENTIFICATION OF ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section Includes:
 - 1. Nameplates and warning signs where specified herein and as shown on contract documents including the following:
 - a. Nameplates and warning signs permanently installed on all electrical equipment and devices including, but not limited to, the following items:
 - 1) Enclosures for transformers, switchboards, motor control, panels, pullboxes, cabinets, motors, generators, transfer switches.
 - 2) Enclosures for all separately enclosed devices including, but not limited to, disconnect switches, circuit breakers, contactors, time switches, control stations and relays, fire alarm panels and lighting control panel.
 - 3) Wall switches not within sight of outlet controlled.
 - 4) Special systems such as, but not limited to, telephone, fire alarm, warning, and signal systems. Identification shall be at each equipment rack, terminal cabinet, control panel, annunciator and pullbox.
 - 5) Devices mounted within and part of equipment including circuit breakers, switches, control devices, control transformers, relays, indication devices and instruments.
 - 2. Conductor and Cable Identification.
- B. Related Sections:
 - 1. Section 26 05 00: Common Work Results for Electrical.
 - 2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
 - 3. Section 26 24 16: Panelboards.
 - 4. Section 26 28 16: Enclosed Switches and Circuit Breakers.
- C. Reference Standards:
 - 1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
 - 2. National Fire Protection Agency (NFPA):
 - a. 70E Standard for Electrical Safety in the Workplace.
 - 3. American National Standards Institute (ANSI):
 - a. A13.1 Pipe Markers.
 - b. Z535 Standards for Safety Signs and Labels.
 - 4. Underwriters Laboratories, Inc. (UL):
 - a. 969 Standard for Marking and Labeling Systems.
 - 5. Code of Federal Regulations, Title 29, Part 1910:
 - a. 144 Safety color code for marking physical hazards.
 - b. 145 Specifications for accident prevention signs and tags.

PART 2 PRODUCTS

2.1 EQUIPMENT LABEL DESIGNATIONS

- A. Equipment labels indicating equipment designations both emergency and normal. Designation per drawings or to be supplied with shop drawings approval.
- B. Panelboard labels showing panel designation, voltage, phase, and source.
- C. Distribution panels, transformers, safety switches, transfer equipment, etc. Labels shall be per ANSI Z535.4 guidelines.

2.2 MATERIALS

- A. For Labels: Three layer laminated plastic or micarta with engraved white letters over black background.
- B. For Emergency Equipment: Use engraved white letters over red background.
- C. For Warning Signs: Minimum 18 gauge steel with red lettering on white porcelain enamel finish.
- D. Arc flash labels shall be provided as required by CEC Article 70E.
- E. Conductor tape number markers: TayMac MX4280 Series non-fading permanent adhesive.

PART 3 EXECUTION

3.1 MOUNTING

- A. Equipment labels shall be mounted by self-tapping, threaded screws, and bolts, or by rivets. Adhesive types are not acceptable unless specifically noted in this section.
- B. Conductor tape markers shall be consistently placed for ready conductor identification.

3.2 HEIGHTS ON LABELS

- A. Panelboards, Switchboards and Motor Control Centers and Special Systems Enclosures: 1/4" identify equipment designation; 1/8" identify voltage rating and source.
- B. Individual Circuit Breakers, Switches, and Motor Starters in Panelboards, Switchboards, and Motor Control Centers: 3/16" identify circuit and load served, including location of equipment.
- C. Enclosed Circuit Breakers, Enclosed Switches, and Motor Starters: 3/16" identify load served.
- D. Transformers: 3/16" identify equipment designation; 1/8" identify primary and secondary voltages, primary source, and secondary load. Include location of primary source or secondary load if remote from transformer.

3.3 WARNING SIGNS

- A. Warning signs shall be permanently mounted with cadmium plated steel screws or nickel-plated brass bolts.
- B. Warning signs to read "DANGER - HIGH VOLTAGE", with letters 1-1/2" high, 3/16" stroke minimum.

- C. Provide warning sign on all doors or immediately next to door for equipment rooms, enclosures or closets containing equipment energized above 150 volts to ground as per CEC, and/ or as directed by the Architect. For interior finish spaces and interior doors, signage shall be coordinated and approved with the Architect in advance of installation.

END OF SECTION 26 05 53

SECTION 26 20 00 - ELECTRICAL DISTRIBUTION EQUIPMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Conditions of the Contract Documents and Division 01 - General Requirements as applicable, apply to this Section.

1.2 SUMMARY

- A. Provide all electrical distribution and accessories required to distribute electrical power to all motors, outlets and systems requiring power.

1.3 QUALITY ASSURANCE

- A. New: Provide all new equipment.
- B. Single Manufacturer: All equipment of each type shall be the product of one manufacturer.
- C. UL: Equipment shall be UL listed. Service entrance equipment shall bear UL Service Entrance label.
- D. CEC: Equipment and installation shall comply with the California Electrical Code.
- E. Wet Locations: Equipment and enclosures installed outdoors and in wet locations shall be approved for the purpose.
- F. IEEE: Institute of Electrical and Electronics Engineers Standard 1015-1997 (Blue Book) Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems.

1.4 LABELING

- A. Nameplates and labeling shall be provided in accordance with Section 26 05 53. All feeders shall be labeled at the feeder device.

1.5 FINISHES

- A. All equipment shall have a factory applied gray finish applied over a rust inhibiting treatment. Any items which have the finish marred shall be touched up or refinished to a new condition before final acceptance. This shall include, but shall not be limited to, sanding and properly removing rust or other contaminants and completely repainting equipment if damage is extensive. Overall acceptance is subject to approval of the Engineer.

1.6 SUBMITTALS

- A. Electrical connections to all equipment furnished by any other division shall be coordinated with final approved equipment submittals from other divisions including but not limited to circuit breaker sizes, conduit sizes, wire sizes, fuse sizes, disconnect switch sizes and starter sizes that differ from those shown on the drawings prior to submitting Electrical Distribution Equipment submittal.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Unless indicated otherwise, all equipment in this section shall be provided from a single manufacturer. The product designations listed are to establish a level of quality. Acceptable manufacturers are,
 - 1. Square D.
 - 2. Siemens.
 - 3. G.E.
 - 4. Cutler-Hammer.

2.2 ENCLOSED SWITCHES

- A. General: Provide heavy duty enclosed switches similar to Square D Class 3100 Type HD.
- B. Switch Interior:
 - 1. All switches shall have switch blades which are visible when the switch is OFF and the cover is open.
 - 2. Lugs shall be front removable and UL Listed for 75 degrees Celsius conductors.
 - 3. All current carrying parts shall be plated to resist corrosion.
 - 4. Switches shall have removable arc suppressors to facilitate easy access to line side lugs.
 - 5. Switches shall have provisions for a field installable electrical interlock.
- C. Switch Mechanism:
 - 1. Switch operating mechanism shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening action of the contacts has started.
 - 2. The operating handle shall be an integral part of the box, not the cover.
 - 3. Provisions for padlocking the switch in the OFF position with at least three padlocks shall be provided.
 - 4. The handle position shall travel at least 90 degrees between OFF and ON positions to clearly distinguish and indicate handle position.
 - 5. All switches shall have a dual cover interlock mechanism to prevent unintentional opening of the switch cover when the switch is ON and prevent turning the switch ON when the cover is open. The cover interlock mechanism shall have an externally operated override, but the override shall not permanently disable the interlock mechanism. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.
- D. Switch Enclosures:
 - 1. Switch covers shall be attached with welded pin-type hinges.
 - 2. The enclosure shall be finished with gray baked enamel paint, which is electrodeposited on cleaned, phosphate pre-treated steel.
 - 3. The enclosure shall have ON and OFF markings stamped into the cover.
 - 4. The operating handle shall be provided with a dual colored, red/ black position indication,
 - 5. All switches shall have provisions to accept up to three (3) 3/8 inch hasp padlocks to lock the operating handle in the OFF position.
 - 6. Tangential knockouts shall be provided to facilitate ease of conduit entry.
- E. Switch Ratings:
 - 1. Switches shall be horsepower rated for ac and/or dc as indicated on the plans.
 - 2. The UL Listed short circuit current rating of the switches shall be 200,000 rms

- symmetrical amperes when used with or protected by Class J fuses.
- 3. Non-Fusible: 10,000 rms symmetrical amps.

F. Fuse Clips: NEMA FU 1, Class J fuses.

2.3 COMBINATION DISCONNECT/ MOTOR STARTERS

- A. Square D - Class 8538 Type S (Fusible or no fuse, as shown on plans):
 - 1. Description: Combine magnetic motor controllers with fusible switch disconnect in common enclosure. Switch shall have a color coded externally operated handle. Operating handle shall give positive visual indication of ON/ OFF with red and black color-coding.
 - 2. Fusible Switch Assemblies: NEMA KS 1, enclosed knife switch with externally operable handle. Fuse clips: Designed to accommodate Class J fuses and visible blades. Operating handle shall give positive visual indication of ON/ OFF with color-coded operating handle.
 - 3. Magnetic Motor Controllers: Refer to paragraph(s) specifying magnetic motor controllers for requirements.

PART 3 EXECUTION

3.1 MOUNTING:

- A. General: All equipment shall be securely fastened in place.
- B. Locations: In all cases mounting locations shall comply with the requirements of the California Electrical Code. This shall include providing suitable working clearances.
- C. Wall Mounted Equipment: Wall mounted equipment shall be suitably positioned on the wall. Equipment mounted on exterior basement wall shall have unistrut channels between the wall and the equipment to prevent condensation problems. Where wall mounted equipment is specified, but a convenient wall not available, a suitable unistrut mounting stanchion anchored in concrete shall be provided. In lieu of this stanchion, small devices may be mounted on to the equipment served if approved by the equipment manufacturer.
- D. Motor rated disconnects: Install disconnects in a vertical orientation with off in the down position.

3.2 DELIVERY, STORAGE AND HANDLING:

- A. General:
 - 1. Store all types of electrical power distribution equipment in a clean, heated building affording appropriate physical protection. Control access to prevent unauthorized tampering with the equipment. However, equipment may be stored in other inside or outside environments under approved conditions.
 - 2. Inspect equipment when received at Project site for shipping damage. Report as required by freight carrier to recover repair or replacement costs from the freight carrier in the event damage was sustained.
 - 3. Covers are required unless indoor, ventilated storage conditions exist. Canvas tarpaulins or the equivalent are preferred over other coverings because they provide better humidity control and enclosure scuff protection. Where exposed to moisture, covers shall be waterproof.
 - 4. The manufacturer's shipping skids shall be left on the equipment to provide structural support until the equipment is set in final resting place.
 - 5. Refer to Section 26 05 00 for additional requirements. Contractor shall furnish new

equipment to replace any equipment that is exposed to weather or subjected to other deleterious effects of construction.

- B. Approved Conditions for Equipment Storage:
1. General: Where storage conditions specified above are not available, indoor, or outdoor storage shall comply with the following.
 2. Switchboards, Motor Control and Other General Distribution and Utilization Equipment:
 - a. Store metal-enclosed equipment in the upright position. Provide good ventilation of the shelter and protection from dirt, moisture, and physical damage.
 - b. Space heaters furnished with the equipment shall be connected to a continuous source of power of the proper rating. Where space heaters are supplied from auxiliary power transformers, care shall be taken that low-voltage heater circuits are properly isolated before power source connection to prevent inadvertent energizing of the auxiliary transformer and associated high-voltage primary wiring.
 - c. Ambient conditions may allow condensation inside waterproof covers. If condensation is occurring, temporary heaters or lamp banks shall be provided of sufficient wattage to prevent condensation.
 - d. Contractor shall ensure that equipment stored in shipping cases receives adequate ventilation to avoid mildew and prevent condensation.

3.3 LABELING:

- A. Nametag: Provide a nametag for each piece of distribution equipment; see Section 26 05 53, Identification for Electrical Systems.

END OF SECTION 26 20 00

SECTION 26 22 00 - LOW-VOLTAGE TRANSFORMERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section Includes:
 - 1. Dry type general purpose transformers rated 600 volts and below.
- B. Related Sections:
 - 1. Section 26 05 00: Common Work Results for Electrical.
 - 2. Section 26 05 33: Raceway and Boxes for Electrical Systems.
 - 3. Section 26 05 26: Grounding and Bonding for Electrical Systems.
- C. Reference Standards:
 - 1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
 - 2. California Building Code (CBC). California Code of Regulations, Title 24, Part 2, Volume 1 & 2.
 - 3. National Electrical Manufacturers Association (NEMA):
 - a. ST 20 Dry-Type Transformers for General Applications.
 - b. TP 1 Energy Efficient Transformers.
 - c. TR 1 Transformers, Step Voltage Regulators and Reactors.
 - d. 260 Safety Labels for Pad-Mounted Switchgear and Transformers Sited in Public Areas.
 - 4. Underwriters Laboratories, Inc. (UL):
 - a. 506 Standard for Specialty Transformers.
 - b. 1561 Dry-Type General Purpose and Power Transformers.
 - 5. United States Department of Energy. Code of Federal Regulations, Title 10, Part 432.
 - a. Energy Efficiency Program for Certain Commercial and Industrial Equipment.

1.3 SUBMITTALS

- A. Submit in accordance with Section 26 05 00: Common Work Results for Electrical.
- B. Shop Drawings:
 - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
 - 2. Include electrical rating, impedance, dimensions, weight, mounting details and materials, decibel rating, terminations, temperature rise, no load and full load losses, and connection diagrams.
 - 3. Complete nameplate data including manufacturer's name and catalog number.
- C. Manuals:
 - 1. Submit, simultaneously with the shop drawings, companion copies of complete operating and maintenance manuals including technical data sheets and wiring diagrams.

PART 2 PRODUCTS

2.1 GENERAL PURPOSE DRY TYPE TRANSFORMERS

- A. Approved manufacturers are:
1. Eaton Electrical, Inc.; Cutler-Hammer Business Unit.
 2. Square D; a brand of Schneider Electric.
 3. General Electric Company; GE Consumer & Industrial – Electric Distribution.
 4. Siemens Energy & Automation, Inc.
 5. Sola/ Hevi-Duty.
 6. Jefferson Electric; a brand of Spire Power Solutions.
 7. Acme Electric; a division of Hubbell.
- B. Unless otherwise specified, dry type transformers shall be in accordance with NEMA, CEC and as shown on the drawings. Transformers shall be UL listed or labeled. All transformers shall comply with NEMA TP-1 energy efficiency standards as adopted by the State of California. Efficiency shall be tested in accordance with NEMA TP2.
- C. Dry type transformers shall have the following features:
1. Self-cooled by natural convection, isolating windings, indoor, dry type. Autotransformers shall not be accepted unless otherwise stated.
 2. Rating and winding connections shall be as shown on the drawings.
 3. Ratings shown on the drawings are for continuous-duty without the use of cooling fans.
 4. Insulation systems:
 - a. Transformers 30 KVA and larger: UL rated 220-degree C system having an average maximum rise by resistance of 115-degree C in a maximum ambient of 40-degree C.
 - b. Transformers below 30 KVA: Same as for 30 KVA and larger or UL rated 185-degree C system having an average maximum rise by resistance of 115-degree C in a maximum ambient of 40-degree C.
 5. Core and coil assemblies:
 - a. Rigidly braced to withstand the stresses caused by short circuit currents and rough handling during shipment.
 - b. Cores shall be grain oriented, non-aging, silicon steel.
 - c. Coils shall be continuous windings without splices except for taps.
 - d. Coil loss and core loss shall be optimum for efficient operation. NEMA TP-1 type.
 - e. Primary and secondary tap connections shall be brazed or pressure type.
 - f. Coil windings shall have end fillers or tie downs for maximum strength.
 - g. Terminals shall be rated 75 degrees C minimum.
 6. Certified sound levels determined in accordance with NEMA, that do not exceed the following:

Transformer Rating	Sound Level Rating
0 - 9 KVA	40 dB
10 - 50 KVA	45 dB
51 - 150 KVA	50 dB
151 - 300 KVA	55 dB
301 - 500 KVA	60 dB

7. Nominal impedance shall be as permitted by NEMA.
8. Single phase transformers rated 15 KVA through 25 KVA shall have two, 5 percent full

capacity taps below normal rated primary voltage. All transformers rated 30 KVA and larger shall have two, 2-1/2 percent full capacity taps above, and four, 2-1/2 percent full capacity taps below normal rated primary voltage.

9. Core assemblies shall be grounded to their enclosures by adequate flexible ground straps.
10. Enclosures:
 - a. Temperature rise at hottest spot shall conform to NEMA Standards and shall not bake and peel off the enclosure paint after the transformer has been placed in service.
 - b. Ventilation openings shall prevent accidental access to live components.
 - c. Thoroughly clean and paint at the factory with manufacturer's prime coat and standard finish.
11. Standard NEMA features and accessories including ground pad, lifting provisions and nameplate with the wiring diagram and sound level indicated on it.
12. Dimensions and configurations shall conform to the spaces designated for their installations.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with the CEC, and as shown on the drawings.
- B. Install the transformers with adequate clearance at a minimum 6 inches or more from wall and adjacent equipment, or as allowed by transformer manufacturer for air circulation to remove the heat produced by transformers and as recommended by the manufacturer to achieve U.L. listing.
- C. Install transformers on vibration pads designed to suppress transformer noise and vibrations.
- D. Use flexible metal conduit to contain the conductors from the transformer to the raceway system.
- E. Transformers shall be secured to meet CBC seismic zone 4 requirements.

END OF SECTION 26 22 00

SECTION 26 27 26 - WIRING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section Includes:
 - 1. Wiring devices.
- B. Related Sections:
 - 1. Section 26 05 00: Common Work Results for Electrical.
 - 2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
 - 3. Section 26 05 26: Grounding and Bonding for Electrical Systems.
 - 4. Section 26 05 33: Raceway and Boxes for Electrical Systems.
- C. Reference Standards:
 - 1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
 - 2. National Electrical Manufacturers Association (NEMA):
 - a. WD 1 General Color Requirements for Wiring Devices.
 - b. WD 6 Wiring Devices - Dimensional Specifications.
 - 3. National Electrical Manufacturers Association (NECA):
 - a. 1 Good Workmanship in Electrical Construction.
 - 4. National Electrical Testing Association (NETA):
 - a. ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
 - 5. Underwriters Laboratories, Inc. (UL):
 - a. 20 Safety General-Use Snap Switches.
 - b. 231 Standard for Power Outlets.
 - c. 498 Attachment Plugs and Receptacles.
 - d. 943 Ground-Fault Circuit-Interrupters.
 - e. 1436 Standard for Outlet Circuit Testers and Similar Indicating Devices.
 - f. 1472 Solid-State Dimming Controls.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Receptacles, Switches, Wall Plates:
 - 1. Cooper Wiring Devices; Division of Cooper Industries, Inc.
 - 2. Hubbell Incorporated; Wiring Device-Kellems.
 - 3. Leviton Mfg. Company, Inc.
 - 4. Pass & Seymour/ Legrand.

2.2 RECEPTACLES

- A. General for all receptacles:
 - 1. Device shall be listed by UL

2. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self-grounding feature (this feature does not substitute for a grounding conductor terminated on grounding strap of device). Terminal screws shall be brass, brass plated or a copper alloy metal.
 3. Receptacles shall be of a screw terminal type, “pressure type quick wire” terminations are not allowed.
- B. Duplex receptacles shall be premium specification grade single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have bussing break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal:
1. Wiring device color shall be standard white. Contractor to verify device color with Architect prior to procurement.
 2. Ground Fault Interrupter Duplex Receptacles - Shall be an integral unit suitable for mounting in a standard outlet box:
 - a. Ground fault interrupter shall be commercial grade and consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. It shall be rated for operation on a 60 Hz, 120 volt, 20-ampere branch circuit. Device shall meet CEC requirements. Device shall have a minimum nominal tripping time of 1/30th of a second. Devices shall meet UL 943.
- C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete and match with appropriate cord grip plug. Devices shall meet UL 231.
- D. Weatherproof Receptacles: Shall consist of a listed weather resistant duplex receptacle, mounted in box with a gasketed, while in use weatherproof, cast metal cover plate and cap receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap.

2.3 SWITCHES

- A. Toggle switches shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles color to match receptacle device color unless otherwise specified:
1. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self-grounding mounting strap with break-off plaster ears and be of a screw terminal type.
 2. Shall be color coded for current rating, listed by UL, and meet the requirements of NEMA WD 1, Heavy-Duty and UL 20.
 3. Ratings:
 - a. 120 volt circuits: 20 amperes at 120-277 volts AC.
 - b. 277 volt circuits: 20 amperes at 277 volts AC.
 4. The switches shall be mounted on the strike plate side of doors.
 5. Incorporate barriers between switches with multi-gang outlet boxes where required by the CEC.
 6. All toggle switches shall be of the same manufacturer.

2.4 WALL PLATES

- A. Wall plates for switches and receptacles shall be type 302 stainless steel.
- B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD1.
- C. For receptacles or switches ganged together, wall plates shall be a single ganged plate.

- D. Wall plates for data, telephone or other communication outlets shall be as specified in the associated specification.
- E. Surface mounted boxes, NEMA1, shall be industrial grade raised galvanized steel covers. In shop areas, all receptacles shall be dust proof and or waterproof where applicable.
- F. Waterproof device covers shall be cast iron, 4-corner screw type, for FS and FD type mounting. Device covers shall be zinc galvanized finish. Weatherproof covers shall be lockable.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with the CEC, NECA “Standard of Installation”, and as shown as on the drawings.
- B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also be connected to the green equipment grounding conductor.
- C. General: Devices shall be of the type specified herein. All devices shall be installed with “pigtailed” leads from the outlet box. No device shall be used in the “feed through” application. Screw terminals shall be used to connect all devices to the circuit and shall be grounded by means of a ground wire where grounding terminals are provided in the device.
- D. Installation: Devices and plates shall be installed in a “plumb” condition and must be flush with the finish surface of the wall where boxes are recessed.
- E. Mounting heights: All control and convenience devices shall comply with California Code of Regulations Title 24 and ADA with respect to accessibility requirements. Mounting heights indicated on plans shall have precedence.
- F. Install switches with the off position down.
- G. Clean debris from outlet boxes.
- H. Provide extension rings as required to bring outlet boxes flush with finished surface or casework.
- I. Test each receptacle device for proper polarity.

END OF SECTION 26 27 26

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

1.2 SUMMARY

- A. This section includes:
 - 1. Disconnect and safety switches where shown on the contract drawings and specified herein.
- B. Related Sections:
 - 1. Section 26 05 53: Identification of Electrical Systems.
- C. Reference Standards:
 - 1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
 - 2. National Electrical Manufacturers Association (NEMA):
 - a. KS 1 Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum).
 - b. AB 3 Molded Case Circuit Breakers and their Application.
 - c. FU 1 Low Cartridge Fuses.
 - d. 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 3. Underwriters Laboratories, Inc. (UL):
 - a. 98 Enclosed and Dead-Front Switches.
 - b. 489 Molded Case Circuit Breakers and Circuit Breaker enclosures.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fusible Switches, non-fusible switches, and molded case circuit breakers:
 - 1. Eaton Electrical, Inc.; Cutler-Hammer Business Unit.
 - 2. Square D; a brand of Schneider Electric
 - 3. General Electric Company; GE Consumer & Industrial – Electric Distribution
 - 4. Siemens Energy & Automation, Inc.

2.2 GENERAL

- A. Disconnect Switches: Provide with devices enabling the switch to be locked in the open or closed positions.
- B. Manual Motor Switches: Tumbler type rated 3HP, 240 Volts with or without overload heaters as required to protect equipment served.
- C. Externally Operable Safety Switches: To have quick-make, quick-break mechanism, capable of switching 10 times switch rating, with cover interlock to prevent opening with switch in ON position and defeat mechanism for maintenance.
- D. Switches: Shall be general duty (GD) for 240 volt and below and heavy duty (HD) for 277V

480 volt type unless otherwise indicated. Provide NEMA 1 enclosures for interior locations and NEMA 3R enclosures for exterior or wet locations. Provide with number of poles, ampacity, voltage, and HP rating, fusible or non-fusible as indicated. Copper blades shall be visible in off position.

- E. Fusible Switches: Equip them with rejection clips for UL Class R fuses. Switches having a dual rating when used with dual element fuses shall have a rating so indicated and shall be confirmed by equipment vendor being connected.
- F. 600 Amperes or Less Fuses: UL Class RK1 with a minimum interrupting rating of 200,000 Amperes, Bussmann "Low-Peak Type" or equal.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION

- A. Locations: Install switches, disconnects and safety where indicated on the Contract Drawings or as required by CEC.
- B. Fastenings: Securely fasten switches to structural members or Unistrut support as directed by the manufacturer.
- C. Label all disconnect switches in accordance with Section 26 05 53: Identification of Electrical Systems.
- D. Fuse: All fuses shall be as indicated on the plan or as required by the equipment. Verify fuse size with equipment manufacturer requirements, prior to installation. Use current limiting fuses as indicated on plan.
- E. Terminals shall be minimum 75 degree rated.

END OF SECTION 26 28 16

SECTION 27 00 00 - COMMUNICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Scope Of Work:
 - 1. The work under this section includes all final design, material, equipment, supplies, labor, testing, and accessories required to furnish and install a complete Structured Cabling System (SCS), Intercom/PA/Clock System, and CCTV System, as indicated on the drawings and as specified herein. These systems shall be defined as **all** cables, equipment, products, etc. as indicated on the drawings, and mentioned in these specifications.
 - 2. It is the intent of the Drawings and Specifications, which are presented in a "design-build" format, for the Contractor to design, provide and install a complete, fully operational, and tested system.
 - 3. All miscellaneous system components including, but not limited to, cables, termination equipment, punch blocks, patch panels, ladder racks, backboards, equipment racks, speakers, clocks, cameras, enclosures, terminal cabinets, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements.
 - 4. Schedule is paramount to the project's success. With this, the structured cabling Contractor will have to be a team player, continually working with the team to facilitate expeditious design, procurement, and construction processes.
 - 5. This project will be performed in a phased construction format. Each phase of construction will be completely installed, labeled and tested, to the greatest extent physically possible, before moving to the next phase.
- B. Reference Standards:
 - 1. Building Industry Consulting Service International (BICSI):
 - a. Telecommunications Distribution Methods Manual (TDMM) – latest edition.
 - b. Customer Owned Outside Plant Design Manual (CO-OSP) – latest edition.
 - 2. Federal Communications Commission (FCC):
 - a. FCC Rules Part 68.
 - 3. American Society for Testing and Materials (ASTM):
 - a. E814 Standard Test Method for Fire Tests of Penetration Fire Stops.
 - 4. Insulated Cable Engineers Association (ICEA):
 - a. Communications Wire and Cable for Premises Wiring.
 - 5. Institute of Electrical and Electronics Engineers (IEEE):
 - a. IEEE 802 Specification for Local Area Networks, latest edition.
 - b. IEEE 802.3 Ethernet, latest edition.
 - 6. International Organization for Standardization (ISO):
 - a. ISO/IEC 11801 Information Technology – Generic Cabling for Customer Premises, latest edition.
 - b. ISO TR 24750 Technical Report
 - 7. National Fire Protection Association (NFPA):
 - a. California Electric Code – 2022 version as adopted by AHJ (CEC).
 - b. ANSI/NFPA 75 Standard for the protection of information technology equipment.
 - 8. National Electrical Manufacturers Association (NEMA).

9. Occupational Safety and Health Administration (OSHA).
 10. Telecommunications Industry Association (TIA):
 - a. TIA/EIA-492AAAC Detail Specification for 850nm Laser-Optimized 50-micron Core Diameter/125-micron Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers.
 - b. TIA/EIA-492AAAD Detail Specification for 850nm Laser-Optimized 50 micron Core Diameter/125 micron Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fiber.
 - c. TIA-526-7 Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
 - d. TIA-526-14 Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant; IEC 61280-4-1 Edition 2, Fiber-Optic Communications Subsystem Test Procedure- Part 4-1: Installed Cable Plant- Multimode Attenuation Measurement.
 - e. ANSI/TIA-568.0 Generic Telecommunications Cabling for Customer Premises, latest edition.
 - f. ANSI/TIA-568.2 Twisted-Pair Telecommunications Cabling and Components Standard, latest edition.
 - g. ANSI/TIA-568.4 Broadband Coaxial Cabling and Components Standard, latest edition.
 - h. ANSI/TIA-569 Telecommunications Pathways and Spaces, latest edition.
 - i. ANSI/TIA-598 Optical Fiber Cable Color Coding.
 - j. ANSI/TIA-758 Customer-Owned Outside Plant Telecommunications Infrastructure Standard, latest edition.
 - k. ANSI/TIA-942 Telecommunications Infrastructure Standard for Data Centers, latest edition.
 - l. ANSI/TIA-1152 Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling, latest edition.
 11. Underwriters Laboratories Standards (UL):
 - a. UL 5 Surface Metal Raceways and Fittings, latest edition.
 - b. UL 5A Nonmetallic Surface Raceways and Fittings, latest edition.
 - c. UL 5B Strut-Type Channel Raceways and Fittings, latest edition.
 - d. UL 5C Surface Raceways and Fittings for Use with Data, Signal, and Control Circuits, latest edition.
 - e. UL 514A Metallic Outlet Boxes, latest edition.
 - f. UL 514B Conduit, Tubing, and Cable Fittings, latest edition.
 - g. UL 514C Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers, latest edition.
 - h. UL 514D Cover Plates for Flush-Mounted Wiring Devices, latest edition.
 - i. UL 943 Ground-Fault Circuit-Interrupters (GFCI), latest edition.
 - j. UL 1363 Relocatable Power Taps, latest edition.
 - k. UL 1449 Transient Voltage Surge Suppressors, latest edition.
 - l. UL 1685 Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables, latest edition.
 - m. UL 1863 Communications-Circuit Accessories, latest edition.
 12. Intetel Testing Services ETL SEMKO (ETL).
- C. The Contractor shall be responsible for obtaining and utilizing the latest Structured Cabling, Architectural, and Electrical plans.
- D. General Requirements
1. Manufacturer:
 - a. The term “manufacturer” shall be defined as the company, or group of companies, that actually produces the products meeting the requirements of this document. The manufacturer shall have a minimum of seven - (7) years of experience in manufacturing products of this type and shall be ISO 9001 Certified. The products, summarized in this specification, shall be supplied by a single manufacturer, with the exception of:

- 1) Data racks and other hardware that is not defined as part of the channel test configuration by ANSI/TIA568 series.
 - 2) Fiber Optic Cable and Outside Plant (OSP) fiber cable.
 - 3) Channel solutions consisting of cabling and connectivity hardware independently tested as by UL or ETL and that are listed Section 2 of this document.
 - 4) Cables manufactured by another manufacturer specifically called out on the drawings.
2. Contractor:
- a. The term “Contractor” shall be defined as the company, or group of companies, that actually installs the products per Section 3 of this document. The Contractor selected to provide the installation of this system shall be certified by the manufacturer in all aspects of design, installation and testing of the products described herein:
 - 1) The Contractor shall hold a valid State of California C-7 Low-Voltage license, shall have completed at least ten (10) projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least the past five (5) consecutive years, and capable of being bonded to assure the Owner’s Project Manager of performance and satisfactory service during the guarantee period.
 - 2) The Contractor shall have a minimum of one (1) Registered Communications Distribution Designer (BICSI RCDD) and a minimum of two (2) BICSI Technician level technicians on staff as full time employees of the Contractor.
 - 3) All work shall be performed under the supervision of a company accredited and trained by the manufacturer and such accreditation must be presented. Contractor must be accredited a minimum of one hundred eighty (180) days prior to bid submittal date.
 - 4) The Contractor shall be a manufacturer’s Authorized Installer and Warranty Station for the equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment.
 - 5) All personnel performing work on this project must have successfully completed the manufacturer’s training course prior to performance of any work on this project. Accreditation will consist of individual employee certifications issued by the manufacturer. All personnel engaged in the testing of fiber optic and category-6 metallic premise horizontal and distribution systems must have successfully completed the test equipment manufacturer’s training. Certification of such training must be presented prior to any work performed on this project.
 - 6) The Contractor selected for this Project shall adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning this Project.
 - 7) The Contractor shall own and maintain tools and equipment necessary for successful installation and testing of fiber optic cable, and category-6 metallic premise horizontal and distribution systems, and have personnel who are manufacturer trained in the use of such testing tools and equipment.
 - 8) The Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.
 - 9) The Contractor shall have the capability to produce the AutoCAD documentation as required elsewhere in this specification.
 - 10) The Contractor shall provide a fingerprint check for all personnel working on School sites. The test shall be performed by the Department of Justice pursuant to California Education Code Section 45125.1.
 - 11) For additional Contractor requirements, see Section 1.06.A.1 (b) of this document in its entirety.

1.3 SUBMITTALS

- A. Submittals shall be presented and formatted per the guidelines in the Division 01 section of this RFP package.
- B. All cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a bold arrow or circle shall indicate which product or part numbers are to be used as part of the installation. The submittal shall include all descriptive pages associated with the product, not just the page showing the part number.
- C. Pre-Installation Submittal Requirements:
 - 1. Within fifteen (15) calendar days after the date of award of the Contract, the Contractor shall submit the following:
 - a. Submittal Binder. Submit eight (8) copies of the complete Submittal Binder to the Owner for review. The binder shall consist of five (5) major sections with each section separated by index tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the index:
 - 1) The first section shall be the "title sheet" which shall include the submittal date, project title and address, name and contact information of the Contractor, and name of the Owner. Include an Index sheet that shall contain a Table of Contents identifying page numbers for each section and the section's items.
 - 2) The second section shall include the following items:
 - a) Contractor's License: A copy of the low voltage Contractor's valid State of California C-7 Low-Voltage license.
 - b) Proof Of Experience: Proof (written documentation) that the low voltage Contractor has been regularly engaged in the business of low voltage contracting consisting of, but not limited to, engineering, fabrication, installation, and servicing of communication systems of the type specified herein for at least the past five (5) consecutive years.
 - c) Pending Litigation: Provide a statement summarizing any pending litigation involving any officer or principal of/or the company, the nature of the litigation and what effect the litigation may carry as it relates to this work in the worst-case scenario. Non-disclosure of this item, if later discovered, may result, at the Owner's discretion, in the Contractor bearing all costs and any cost related to associated delays in the progress of the work.
 - d) Insurance Certificates: Copy of low voltage Contractor's current liability insurance and state industrial insurance certificates in conformance with the contract documents.
 - e) Project List: A List containing at least ten (10) California installations completed within the last five (5) years by the low voltage Contractor that are comparable in scope and nature to that specified in the contract document.
 - f) Contractor must include up-to-date contact information for each project listed including contact name, title, email address and phone number.
 - g) Service Capability: Documentation indicating in detail that the low voltage Contractor has competent engineering, installation, service personnel and facilities with reasonable stock of service parts within 75 air-miles of the job site. Do not submit a Contractor's company sales brochure as documentation.
 - h) Authorization Letters: Letters from the low voltage equipment manufacturer stating that the low voltage bidding Contractor is a Factory Authorized Distributor/Installer, and is trained and certified for the equipment he proposes to use on this project, and is licensed to purchase and install software required to provide the specified functions.
 - i) Certification: Copy of the following current BICSI certifications. Provide

proof that the certificate holders are full time employees of the low voltage Contractor's local facility servicing this project and will be actively involved on site for the duration of this project.

- i. BICSI RCDD, minimum of (1). Mandatory requirement: Shall be on site a minimum of one (1) day per workweek.
 - ii. BICSI Technician, minimum of (2). Mandatory requirement: Shall be on site a minimum of five (5) full 8-hour days perworkweek.
 - j) Proof of Trained Personnel: Documentation that the Contractor has full time on-staff personnel, manufacturer trained and BICSI certified, for the equipment proposed for this project, and on-staff manufacturer trained and certified by the Test Equipment manufacturer in the proper use of the test equipment required on this project. Provide copies of all manufacturers' training/certification documentation, and Test Equipment manufacturer's training/certification documentation. Provide a statement that personnel meeting these qualifications are in the local facility, and will be maintained at that facility throughout the project and the warranty period.
- 3) The third section shall contain a **detailed** and complete Bill of Materials including the product description, part number and manufacturer name, quantity, unit of measure, and corresponding specification section number or drawing sheet number where that product is referenced. Also listed in the Bill of Materials shall be test equipment to be used to test the optical fiber, copper, and coax components. Include all patch cords and other specialized components.

a) See example format below:

Description	Part #	Quantity	UoM	Spec	Test Equip.
Cat-6 Station cable	Belden #12345	10 boxes	1000ft/box	2.03	Fluke DTX-1800

- b) This information may be used by the Owner to evaluate the Contractor's general understanding of the project scope during the bid evaluation. Errors/Omissions from this Bill of Materials does not relieve the Contractor from providing all material, components, labor, etc., as outlined in this document and on the drawings to provide a complete and fully functional system(s).
- 4) The fourth section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in this document, and all materials described on the construction drawings. Also include manufacturer's cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the bill of materials list. On each cut-sheet, provide an indicating arrow next to each part number_of proposed material.
- 5) The fifth section shall contain a designation schedule for each system component location, and complete "E" size (30" x 42") (unless otherwise specified) bond drawings, showing system wiring plans. The professionally drafted drawings shall be generated on AutoDesk AutoCAD 2004 or later computer design software. These drawings shall also include:
- a) MDF and IDF Diagrams - Including:
 - i. Cable routing, conduit sleeve(s) locations, sizes and fill count.
 - ii. Floor plan identifying locations of all components and apparatus.
 - iii. Detailed layout and elevations of the wall field(s).
 - iv. Labeling plan.
 - b) Site Plan – Including:
 - i. Conduit quantity, sizes and routing of all site conduits including in-ground vaults, pull boxes, and manholes, including labeling plan.
 - ii. Building designations.
 - iii. MDF and IDF locations and labeling in each building.

- iv. Cabling type and quantity between MDF and each IDF location.
 - c) Work Area Floor Plans - Including:
 - i. Detailed cable routes, including quantity of cables.
 - ii. Device locations and quantities.
 - iii. Approved labeling plan for all work area outlets, cabling, and devices.
 - d) Cross Connect Documentation - Including:
 - i. Cross-connect records for all voice, data, speaker, clock and IP camera devices. Provide in Excel format.
 - e) Riser Distribution Plan.
 - f) Rack elevations of all MDF and IDF equipment properly labeled.
 - g) 1/4-inch scale floor plans of all MDF and I DF data rooms identifying all equipment properly labeled.
 - h) Cable Tray, Conduit, and Raceway Plans (if applicable) with quantities, cable type and cable quantity for each.
 - i) Campus Distribution Plan (if applicable).
- D. Failure to comply with any of the requirements listed above may result in the rejection of the entire submittal package.
- E. Post Installation Submittal Requirements:
- 1. Within fifteen (15) calendar days after the completion of work, the Contractor shall submit the following:
 - a. Record Documentation:
 - 1) Final Test Results – Test results for each cable indicating tests performed, results obtained and values measured. Test results shall be provided in electronic format (CD) with the associated application (if required) for viewing. Testing shall be conducted in accordance with Section 3.09 of this document.
 - 2) As-Built Drawings – Contractor shall provide two (2) complete sets of professionally drafted “E” size (30” x 42”), unless otherwise noted, reproducible bond as-built drawings, generated on AutoDesk AutoCAD 2004 or later. Contactor shall provide/create all backgrounds, site plan and floor plans. Borders shall be Contractor-provided or Architect provided. All borders shall be reviewed by Owner or Architect prior to acceptance by Owner:
 - a) MDF and IDF Diagrams including:
 - i. Cable routing, conduit sleeve(s) locations, sizes and fill count.
 - ii. Floor plan identifying locations of all components and apparatus.
 - iii. Detailed layout and elevations of the wall field(s).
 - iv. Labeling plan.
 - b) Site Plan – Including:
 - i. Conduit quantity, sizes and routing of all site conduits including in-ground vaults, pull boxes, and manholes, including labeling plan.
 - ii. Building designations.
 - iii. MDF and IDF locations and labeling in each building.
 - iv. Cabling type and quantity between MDF and each IDF location.
 - c) Work Area Floor Plans - Including:
 - i. Detailed cable routes, including quantity of cables.
 - ii. Device locations and quantities.
 - iii. Approved labeling plan for all work area outlets, cabling, and devices.
 - d) Cross Connect Documentation - Including:
 - i. Cross-connect records for all voice, data, speaker, clock and IP camera devices. Provide in Excel format.
 - e) Riser Distribution Plan.
 - f) Rack elevations of all MDF and IDF equipment properly labeled.
 - g) 1/4-inch scale floor plans of all MDF and I DF data rooms identifying all

- equipment properly labeled.
 - h) Cable Tray, Conduit, and Raceway Plans (if applicable) with quantities, cable type and cable quantity for each.
 - i) Campus Distribution Plan (if applicable)
- F. Contractor shall provide to Owner two (2) sets of CDs containing all post-installation submittals and close-out documentation.
- G. As-Built Documentation Display In Each MDF and IDF: Within fifteen (15) days after the completion of work, the Contractor shall install a complete Contractor-provided, professionally drafted as-built floor plan in each MDF and IDF. These documents shall be mounted in a suitably-sized frame containing a Plexiglas cover. Each floor plan, generated on AutoDesk AutoCAD 2004, or later, computer design software and printed in color. Size of plans displayed shall be full size, or at the discretion of the District, half-size. The plans shall depict all jack locations in each classroom, office, and all other areas. Also depicted shall be speaker, clock, wireless access point, terminal cabinets, MDF, IDF, pull boxes, vaults, cameras, television jack locations, or any other communications outlet cable installed by the Contractor. All jack locations shall be color-coordinated with the Owner's labeling scheme as described elsewhere in this specification.
- H. Warranty Documentation:
1. Contractor shall apply for all Manufacturers' Extended Warranties on behalf of the Owner. Contractor shall present to Owner all General and Specific Warranty Documents per Warranty Specifications Sections. Warranty shall commence after final acceptance of System and Project close-out by the Owner.

1.4 QUALITY ASSURANCE

- A. It is the intent of these specifications to establish an installation standard of quality for labor and materials. For any proposed product substitution or when the Contractor intends to include an "or equal" product in the bid pricing, provide a substitution/or-equal request submittal to the Owner's Project Manager for review no later than fifteen (15) calendar days **prior** to Bid submittal. This report shall include all of the following items:
1. Description of how the proposed product(s) will impact meeting the project completion date, indicate all item(s) with lead times and expected delivery date(s).
 2. Itemized cost comparisons between the proposed product(s) and the listed product(s).
 3. Detailed technical analysis of the electrical and mechanical specification differences between the proposed product(s) and the listed product(s).
 4. ETL "Verified" or UL "Verified" test lab documentation for the proposed product(s) and assemblies proposed.
 5. Proposed product identification, manufacturer literature (specifications and cut sheets).
 6. Name, address and current contact information of several (minimum of 2) similar projects where the substituted product(s) have been used.
 7. Name, address and contact information of the proposed product(s) manufacturer's local representative.
 8. Sample proposed product(s) manufacturer's component and application warranty. Detailed warranty requirements are described in this Section.
- B. The Owner's Design Team/Project Manager must approve any proposed product(s) substitution item in writing. The Owner's Design Team/Project Manager reserves the right to require a complete sample of any proposed product(s) and may request a sample tested by an independent testing consultant to prove equality. The decision of the Owner's Design Team/Project Manager regarding equality of proposed product(s) items will be final.
- C. If a proposed product(s) is given final acceptance by the Owner's Project Manager, the Contractor shall reimburse the Owner's Design Team/Project Manager for the costs to

review the proposed product(s) substitution(s), and for any additional engineering charges, and shall pay all charges of other trades resulting from this products use, at no cost to the Owner.

D. CCTV Qualification Statement:

1. Provide a current letter of recommendation from Bosch. The Contractor must be certified with Bosch and be BVMS Certified for at least twelve (12) months prior to letter of recommendation. The letter of recommendation must be provided to the District at time of bid.
2. Provide individual installer's experience and qualifications, which shall include three (3) years of projects of similar complexity. Include names and locations of two (2) projects successfully completed in the previous three (3) years.
3. Provide documentation stating you have been in the telecommunication contracting business for a minimum of five (5) years under the same name and are located within a four (4) hour response time of the District.
4. Provide BVMS certification documentation of the certified installer for this project at time of bid.
5. Provide complete instructions on correct operation of system to personnel designated by District. All instructions shall be given during one (1) predetermined time period, coordinated with the District Technology Representative. At the completion of training, the Contractor shall send a confirming letter to the District Technology Representative with the date of instruction, names of District's personnel who were instructed, and a summary statement of the instruction presented.

E. Project Direction:

1. Single Point of Contact:
 - a. Contractor will provide an English proficient, single point of contact, i.e., Project Manager, to speak for the Contractor and to provide the following functions:
 - 1) Initiate and coordinate tasks with Owner's Project Manager, and others as specified by Owner's Project Manager.
 - 2) Provide day-to-day direction and on-site supervision of Contractor personnel.
 - 3) Shall be readily available to the Owner/Owner's Project Manager 24 hours a day / 7 days a week throughout the duration of the Project.
 - 4) Shall have full time cellular phone capability, and the ability to send/receive email correspondence, accessible by the Owner's Project Manager.
 - 5) Ensure conformance with all Contract provisions.
 - 6) Participate in weekly site project meetings and construction meetings.
 - 7) Provide detailed and written weekly status reports to Owner's Project Manager. The content shall be substantive enough to bring about a full understanding of all situations current and situations future. Weekly reports shall include but are not limited to detailed Weekly Progress Report, RFI status log (Request for Information), Change Order Log (pending and approved), Project Addendum Log. Each of the above must show assigned responsibilities and event history. Weekly reports shall include milestone information, resource updates (staff and materials), and any conditions or incidents that may impact the Project Schedule. Contractor shall provide hard copies to Owner.
 - 8) This individual will remain as Project Manager for the duration of the project. The Contractor may change Project Managers only with the Owner's Project Manager's written approval.
2. Planning:
 - a. Planning meetings and schedule: Within fifteen (15) calendar days after the date of award of the Contract, an initial planning meeting will be held with the successful bidder to clarify all requirements (systems, services, distribution methods, etc.), identify responsibilities, and schedule the events that will transpire during the implementation of the project. Within seven (7) calendar days of this initial meeting,

the Contractor shall provide a written report and project schedule to clearly document the events and responsibilities associated with the project. Contractor's project schedule shall conform to the overall Project Construction Schedule issued by the Construction Management Company or the Owner. Contractor is required to attend all planning and other construction meetings as requested by the Owner, Architect, or Engineer.

- F. General Engineering and Design Guidelines:
1. Cabling System Installation Practices:
 - a. Cable tie (tie wrap) devices shall not be utilized at any time. Only Velcro™ -type strap devices are permitted. Velcro™ -type straps are to be utilized in the MDFs and IDF's at a maximum interval of three (3) feet.
 - b. All pull rope devices are to be replaced in all pathways with new pull rope or approved pull string, for future use.
 - c. All intra-building cabling shall be routed either parallel or at right angles to the building structure and/or walls.
 - d. All innerduct shall be supported at a maximum of eighteen (18) inch intervals if running vertical and maximum of forty-eight (48) inch intervals if running horizontal.
 - e. No cabling is to be pulled through electrical Condulet (L-bend) devices. If Condulet devices are pre-existing and it is determined by the review of the District's representative that sufficient space in the conduit is available, the Contractor shall remove the Condulet cover, and pull the cable through the Condulet, then carefully reinstall the cover.
 - f. Communications cabling shall never be tied to electrical power cables or devices, lighting systems, or co-exist in any pathway with power cabling.
 - g. Any visible damage to a cable such as kinks or bends in violation of the minimum bend radius shall render the cable segment defective and shall be removed and replaced.
 - h. All materials shall be new, unused, and delivered to job site in original manufacturer or distributor cartons or packages. No previously installed material shall be used at any time.
 2. Equipment Room – Main Distribution Frame (MDF):
 - a. Site Selection: Careful consideration is required in the selection of the ideal site for equipment placements. Site selection should comply with all provisions of TIA 569; including the following:
 - 1) Floor Loading: If equipment room is not on ground level or a basement, the floor support system should be designed for distribution loading greater than 250 lbs/ft, and a concentrated loading should be greater than 1000 lb/f over the area of the greatest stress to be specified.
 - 2) Room Size: An allowance shall be made for non-uniform occupancy throughout the building. Provide 0.75 square feet of equipment room space for every 100 square feet of workstation space, or a minimum of 150 square feet, whichever is greater.
 - 3) Water Infiltration: The equipment room shall be free of water. No plumbing or waste pipes shall enter or pass through the equipment room.
 - 4) Environmental Requirements: The equipment room should be provided with temperature control equipment (HVAC) to maintain the temperature inside the room between 64-75 degrees Fahrenheit, while the equipment is operating.
 - 5) Power Requirements: A separate power supply serving the equipment room shall be provided and terminating at its own electrical panel.
 3. Special Design Cases-IDF to Adjacent Buildings:
 - a. In the event that a building with minor data needs is located nearby another building that contains an Intermediate Distribution Frame room (IDF), connectivity may be provided as if it were a horizontal run from the IDF to the adjacent building, if the following conditions are met. The total installed cable length from the IDF to

the jacks in the adjacent building must be less than 295 feet (90 meters). Category-6 cable shall be used. This should be done while maintaining the minimum 25-year manufacturer's warranty. Utilize outside plant rated cable when installed in underground conduit. Cable shall not be installed aerially between above-ground poles or other structures:

- 1) Each outlet shall be cabled with Category-6 cable terminating to a Category-6 modular jack. Each jack will be Category-6 RJ-45 with a 110-termination using the 568 wiring scheme.
- b. Room additional drops:
- 1) Provide 1 drop (cable, jack and faceplate) on the back wall of the classroom. This is to power an I.P. clock/speaker.
 - 2) Jack to be above ceiling or at ceiling line where clock is to be placed.
 - 3) Retrofit cable 6' length above ceiling with plug connection. Wire plugs directly to speaker board – no box.
- c. One (1) wireless access point, ceiling mounted in the center of the room below the T-bar grid, shall be provided in each classroom.
- d. Surface Mounted Raceways:
- 1) In existing structures, or where called out on the plan documents, Wiremold 2300 or 5400-series surface mounted raceway system shall be used for surface-mount applications.
 - 2) In new construction projects, surface mounted raceway shall not be utilized unless specifically called out on the plan documents and approved by the Owner's project engineer.
 - 3) Wiremold raceway shall be properly fastened into wall studs at intervals not to exceed 16-inches in horizontal runs and 2 feet in vertical runs. Wiremold must be mounted flush to the wall with no visible gap between the Wiremold and wall.
 - 4) The voice/data cabling shall occupy one channel only of the two-channel system.
 - 5) Wiremold raceway shall be installed to the station outlets branching off the main cable routes or separate runs shall be installed to individual outlets as required. At no time shall the raceway fill rate exceed 40 percent.
 - 6) Each Wiremold raceway run shall include the appropriate cover and utilize cover clips to hide seams between coversections.
 - 7) Each vertical Wiremold raceway run that penetrates a ceiling shall include an entrance end fitting with cover. Ceiling fittings shall be installed so that it is in direct contact with the ceiling, without any gaps between ceiling and fitting cover. Ceiling openings shall be neatly and squarely trimmed by the Contractor to the satisfaction of the District.
 - 8) In order to meet and exceed all current and future cable bend radius requirements, Contractor shall only install Wiremold radiused "FO"-type elbows and tee fittings.
- e. Surface Mounted Raceways
- 1) In existing structures, or where called out on the plan documents, Wiremold 2300 or 5400-series surface mounted raceway system shall be used for surface mount applications.
 - 2) In new construction projects, surface mounted raceway shall not be utilized unless specifically called out on the plan documents and approved by the Owner's project engineer.
 - 3) Wiremold shall be properly fastened into wall studs at intervals not to exceed 16- inches in horizontal runs and 2 feet in vertical runs. Wiremold must be mounted flush to the wall with no visible gap between the Wiremold and wall.
 - 4) The voice/data cabling shall occupy one channel only of the two-channel system.
 - 5) Wiremold raceway shall be installed to the station outlets branching off the main cable routes or separate runs shall be installed to individual outlets as

required. At no time shall the raceway fill rate exceed 40 percent.

- 6) Each Wiremold raceway run shall include the appropriate cover and utilize cover clips to hide seams between cover sections.
- 7) Each vertical Wiremold raceway run that penetrates a ceiling shall include an entrance end fitting with cover. Ceiling fittings shall be installed so that it is in direct contact with the ceiling, without any gaps between ceiling and fitting cover. Ceiling openings shall be neatly and squarely trimmed by the Contractor to the satisfaction of the District.
- 8) In order to meet and exceed all current and future cable bend radius requirements, Contractor shall only install Wiremold radiused "FO"-type elbows and tee fittings.

G. Specific System Requirements:

1. Backbone Infrastructure Cabling – Data:

a. Backbone Fiber Optic Cabling:

- 1) For distances up to 1800 feet (550 meters), the Contractor shall provide one (1) OM4 12-strand multimode fiber optic cable for backbone connectivity between the MDF and each IDF. For cabling to isolated structures with limited data needs, such as a concession stand, 4-strand OM4 multimode fiber optic cable may be considered.
- 2) For distances greater than 1800 feet (550 meters), the Contractor shall provide one (1) 12-strand single mode fiber optic cable for backbone connectivity between the MDF and each IDF.
- 3) At the MDF, provide a 20-foot slack loop neatly coiled, labeled and secured. At each IDF, provide a 10-foot slack loop neatly coiled, labeled and secured.
- 4) Splicing of fiber optic cable shall not be permitted.
- 5) All exposed fiber optic cable shall be enclosed in inner-duct. Inner-duct is not required within dedicated inter-building conduits.
- 6) Provide 1-meter and 2 -meter fiber optic patch cords for each pair of strands terminated at the MDF and each IDF.
- 7) See Part 2 of this document for fiber optic cable specifications.

b. MDF/IDF UTP Termination Equipment:

- 1) The horizontal cross-connect for data circuits shall consist of patch cords from the horizontal Category-6 termination panels to the network equipment within the same or adjacent racks.
- 2) The MDF horizontal data cross-connect shall be contained in 19"x 7' rack(s) or free standing lockable cabinet, the IDF shall be terminated in an appropriately sized locking cabinet or equivalent as described in Part 2 of this document.
- 3) 2-post and 4-post open racks shall be installed with vertical wire management on each side. Patch panels shall be 24 or 48 modular jack ports, wired to T568B, with 1U horizontal wire management immediately below each patch panel.
- 4) Category-6 patch cords and drop cords shall be provided by Contractor. Provide one (1) 3-foot cord or 7-foot cord for the MDF/IDF and one (1) 14-foot cord for each outlet jack port. In instances where longer cords are required, the Contractor is to clarify the requirement with the District before installing any longer cords.
- 5) See Part 2 of this document for cable specifications.

1.5 WARRANTY

A. A twenty-five (25) year Extended Product Warranty and Application Assurance for the Voice/Data/Intercom-Clock/CCTV wiring systems shall be provided as follows:

1. 25 Year Extended Product Warranty:

- a. The 25 Year Extended Product Warranty shall ensure against product defects, that

all approved cabling components exceed the specifications of ANSI/TIA 568 series and ISO/IEC 11801 series, exceed the attenuation and NEXT requirements of ANSI/TIA 568 series and ISO/IEC 11801 series for cabling channels, that the installation will exceed the loss and bandwidth requirements of ANSI/TIA 568 series and ISO/IEC 11801 series for fiber channels, for a twenty-five (25) year period. The warranty shall apply to all passive SCS components.

- b. The 25 Year Extended Product Warranty shall cover the replacement or repair of defective product(s) **and** labor for the replacement or repair of such defective product(s) for a twenty-five (25) year period.
 2. 25 Year Application Assurance:
 - a. The 25 Year Application Assurance shall cover the failure of the wiring system to support the application which it was designed to support, as well as additional application(s) introduced in the future, up to 350Mbps parallel transmission schemes, by recognized standards or user forums that use the ANSI/TIA 568 series or ISO/IEC 11801 series component and channel specifications for cabling, for a twenty-five (25) year period.
 3. System Certification:
 - a. Upon successful completion of the installation and subsequent inspection, the Owner's Project Manager shall be provided with a numbered certificate, from the manufacturing company, registering the installation.
- B. Manufacturer Site Certifications are not allowed, regardless of project size.
- C. A fire (5)-year labor and material warranty for the Intercom/PA/Clock system shall be provided.
- D. A three (3)-year labor and material warranty for the CCTV system shall be provided.

PART 2 PRODUCTS

2.1 STRUCTURED CABLING SYSTEM

- A. Acceptable Manufacturers - all equipment listed herein will be by:
 1. SCS components: Leviton eXtreme 6+ cat-6 UTP System with BerkTek Lanmark 1000 cable, Belden System 3600, or Equal.
 2. Cabinets, Racks, Wire Management, and Ladder tray: Chatsworth, Encore, Southwest Data Products, or UL Listed and approved equal.
 3. Riser and Outside Plant (OSP) Fiber Cable: Belden, AMP, or Superior Essex.
 4. Riser and OSP Copper Cable: Belden, AMP or Superior Essex.
 5. Protectors: Circa, Emerson, or Marconi.
- B. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.
- C. The functions and features specified are vital to the operation of this facility; therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the Contractor from strict compliance with the requirements of this specification.
- D. See Quality Assurance section of this specification for additional product substitution requirements.

2.2 OUTLETS

- A. Faceplates
 1. All Faceplates shall be available in single, duplex, triplex, quad, or six-plex

- arrangement in a single gang configuration.
2. Faceplates shall be available in eight-plex arrangement in a dual gang box configuration.
 3. Surface mount boxes shall be available in single, dual, quad, and six-plex configuration.
 4. Modular furniture faceplates shall be available in single, dual, triple and quad configuration for the Owner's modular existing and/or new modular furniture. Faceplates shall be flush-mounted in the modular furniture. Surface mounted boxes/faceplates are unacceptable. The Contractor is responsible for coordinating with the Owner's modular furniture Contractor to determine faceplate requirements. The Contractor shall provide and install all parts/fittings necessary to meet the requirements of this section.
 5. Wall mounted phone jack faceplates shall be single gang configuration, constructed of stainless steel and have two standard phone mounting posts located above and below the jack opening. Wall mounted phone faceplates will consist of 8p8c modular (RJ-45) jacks.
 6. Faceplates shall have designation windows with clear plastic covers.
- B. Communications outlets shall consist of one, two or three gang utility outlet boxes plates equipped with 8-pin modular (RJ-45) jacks utilizing T568B wiring scheme. All outlet cabling shall terminate on termination blocks at their associated Main Distribution Frame (MDF) room, Intermediate Distribution Frame (IDF) Rooms, or as otherwise indicated on the drawings.
- C. Unless otherwise noted on the floor plans, or within this document, all data wall outlets for 23- AWG copper cable shall be:
1. 8-position/8-conductor (8p8c) modular outlets for data and for voice.
 2. Insulation displacement.
 3. Support universal applications in a multi-vendor environment, accepting modular RJ-45 plugs for data outlets and for voice outlets.
 4. Provide with blank module inserts for all unused module locations. Jack module arrangement is shown on the drawings. Provide color-coded inserts at each outlet, termination block and at patch panels.
- D. Category-6 Gigabit outlets
1. All Category-6 outlets shall meet or exceed Category-6 transmission requirements for connecting hardware, and be part of the UL LAN Certification and Follow-up Program.
 2. The Category-6 outlets shall be capable of being in a modular patching situation or as a modular telecommunication outlet (TO) supporting current 10Base-T, Token Ring, 100 Mbps TP-PMD, 155 Mbps ATM, 622 Mbps ATM using parallel transmission schemes and evolving high-speed, high-bandwidth applications, including Ethernet, 1000BASE-T and 1.2 Gbps ATM.
- E. Product Specification: Leviton, Belden or equal.

2.3 STATION CABLE

- A. Category-6 UTP cables shall extend between the station location and its associated TC and consist of 4-pair, 23-AWG, unshielded, twisted pairs, and shall terminate on 8 - position modular jacks provided at each outlet.
- B. Category-6 UTP, 4 Pair:
1. The high performance Category-6 UTP cable shall be of the traditional round shape with a central spine design to maintain stable pair position.
 2. The cable jacket shall comply with Article 800 N EC and labeled CMP for use as a plenum cable when installed in plenum-rated spaces, and labeled CMR when installed

in riser-rated and non-plenum-return spaces. CMP and CMR cable shall not be installed in underground conduit unless it includes an outdoor wet-location rating.

- C. All Category-6 high performance cables shall meet or exceed the following: Electrical Characteristics:

DC Resistance Max	7.7 (Ohms/100m @ 20°C max)
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1. Physical specifications:

	Non – Plenum	Plenum
Conductor size	23AWG	23AWG
Diameter	.235" nominal	.23" nominal
Weight/1000ft	27 lbs.	32 lbs.

2. Guaranteed Electrical Performance Requirements (dB/100M):

Freq MHz	Insertion Loss Max.	Min. PSNEXT	Min. PSACR	Min. Return Loss
10.0	5.8	62.3	56.5	25.0
16.0	7.4	59.2	51.9	25.0
25.0	9.3	56.3	47.1	25.0
62.5	15.0	50.4	35.4	25.0
100.0	19.3	47.3	28.0	25.0
200.0	28.3	42.8	14.5	21.6
250.0	32.1	41.3	9.2	20.5
300.0	35.6	40.1	4.5	20.1

Freq MHz	Min. Bal. TCL	Min. Bal. ELTCTL		
10.0	42.0	17.0		
16.0	40.0	12.9		
25.0	38.0	9.0		
62.5	34.0	--		
100.0	32.0	--		
200.0	29.0	--		
250.0	28.0	--		
300.0	--	--		

- D. Product Specification: Belden, BerkTek, orequal.

2.4 MODULAR PATCH PANEL SYSTEM

- A. The termination block shall support the appropriate emerging high-bandwidth applications, including 1 Gbps Ethernet, potentially 1.2 Gbps ATM and 2. 4 Gbps ATM, Multi-Tasked Split Screen Computing, Virtual Holographic Video Conferencing, Instant Access Telemedicine, 3D CAD/CAM Engineering, and Internet-Intranet Communications/ Commerce, as well as all 77 channels (550 MHz) of analog broad band video, including 1000 Mbps Ethernet and potentially 1.2 Gbps ATM, and facilitate cross connection and inter connection using modular patchcords.
- B. All Modular jack panels shall be wired to using T568B wiring scheme.

- C. The wiring block shall be able to accommodate 23 AWG cable conductors.
- D. The Category-6 modular jack panels shall meet or exceed the Category-6 standards requirements in ISO/IEC 11801 and ANSI/TIA/EIA and shall be UL Listed.
- E. A 110-IDC termination block shall provide for the termination of horizontal, equipment, or tie cables.
- F. All patch panels shall have two (2) cable strain relief/management bars (Leviton #49005-CMB or equal) installed at the rear of the panel to support the terminated horizontal cabling.
- G. Each patch panel shall have one horizontal wire manager installed above and below.
- H. Product Specification: Belden, Leviton or equal.

2.5 CATEGORY-6 – PATCH/STATION CORDS

- A. Provide Category-6 Modular Patch/Station cords for each assigned port on the patch panel and for each outlet in the station locations. Cords shall be equipped with an 8-pin 8-conductor modular connector on each end and shall conform to the length(s) specified. All cords shall be wired to T568B standards. All cords shall be factory-built by the station cabling manufacturer. Fabrication of cords in the field is prohibited.
- B. All patch cords shall exceed ANSI/TIA/EIA and ISO/IEC Category-6/Class E specifications. Patch cords shall be available in stranded and solid conductor in lengths to twenty (20) feet.
- C. The patch cord shall have built-in exclusion features to prevent accidental polarity reversals and split pairs.
- D. Miscellaneous:
 - 1. UL Listed for Fire Safety.
 - 2. ISO 9001 Certified Manufacturer.
- E. Product Specification: Belden, Leviton, or equal.

2.6 FIBER OPTIC CABLING

- A. OM4, Laser optimized, extended distance fibers with 50 micron cores only.
- B. Fibers must comply with ANSI/TIA/EIA 492 specifications and ISO/IEC 11801 standards.
- C. Fibers will have dual wavelength capability; transmitting at 850 and 1300nm ranges.
- D. Shall be designed to support 10Gb/s applications up to 1800 feet (550 meters).
- E. Maximum attenuation @ 850/1300 nm: 2.8/1.0 dB/KM.
- F. 550 Meter laser bandwidth 2200 MHz-km @850 nm, 500 MHz-km @1300 nm
- G. All fiber in a cable run shall be from the same manufacturer and shall be the same type. A mix of fibers from different manufacturers may not be used.
- H. Loose tube cables shall be gel free. Tight buffered cables shall be gel free, riser rated, and plenum rated when installed in a plenum rated environment.

I. Product Specification:

1. Outside Plant Cables: Belden, BerkTek or equal. Provide fan-out kits as required.
2. Building Cables: Plenum-Rated (installed inside plenum innerduct), Belden, BerkTek or equal.

Core	50 µm
Performance	Laser optimized 10 Gigabit to 550 meters
Numerical Aperture:	0.200 ± 0.015
Cladding diameter:	125 µm ± 1 µm
Colored Fiber Diameter:	250 µm ± 15 µm
Minimum Tensile Strength:	100,000 psi
Fiber Minimum Bending Radius:	.75 in. (1.91 cm)
Cable Minimum Bending Radius:	
During Installation:	20 times cable diameter
After Installation:	10 times cable diameter
Operating Temp. Range:	32°F to 122°F (0°C to 50°C)
Storage Temp. Range:	-40°F to 149°F (-40°C to 65°C)
Maximum Fiber Loss (attenuation):	2.8 dB/km at 850 NM 1.0 dB/km at 1300
Minimum Bandwidth:	1500 MHz-km OFL BW at 850 NM 500 MHz-km OFL BW at 1300 NM 2000 MHz-km EMB at 850NM

J. Single Mode Fiber specifications:

1. Fibers must comply with ANSI/TIA/EIA 492 specifications and I SO/IEC 11801 standards.
2. All fiber shall be color coded to facilitate individual fiber identification.
3. Fiber will have coating to ensure color retention, minimize microbending losses and improve handling. The coating shall be mechanically strippable.
4. Loose tube cables shall be gel free. Tight buffered cables shall be gel free, riser rated, and plenum rated when installed in a plenum rated environment.

Fiber Attribute	Depressed Cladding	Matched Cladding
Cladding Diameter	125.0 ± 1.0 µm	125.0 ± 1.0 µm
Cladding Non-Circularity	≤ 1.0%	≤ 1.0%
Colored Fiber Diameter	250 ± 15 µm	250 ± 15 µm
Core Diameter	8.3 µm	8.3 µm
Index of Refraction	0.37%	0.33%
Core/Cladding Concentricity	≤ 0.8 µm	≤ 0.8 µm
Mode Field Diameter	8.8 ± 0.5 µm @ 1310 NM	9.3 ± 0.5 µm @ 1310 NM
Minimum Proof Strength	100,000 psi	100,000 psi
Maximum Attenuation	.40 dB/km @ 1310 NM .30 dB/km @ 1550 NM	.40 dB/km @ 1310 NM .30 dB/km @ 1550 NM
Maximum Dispersion	2.8 ps/NM-km 1285 to 1330 NM	3.5 ps/NM-km 1285 to 1330 NM
Fiber Cutoff Wavelength	≤ 1130 NM. ≤ 1300 NM	≤ 1150 NM. ≤ 1350 NM
Fiber Macrobend (100 turns @ 32 mm diameter)	≤ 0.05 dB @ 1310 NM ≤ 0.10 dB @ 1550 NM	≤ 0.05 dB @ 1310 NM ≤ 0.10 dB @ 1550 NM
Coating Strip Force	1.3 N □ F □ 8.9 N	1.3 N □ F □ 8.9 N

Fiber Attribute	True Wave
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Cladding Diameter	125.0 ± 1.0 µm
Cladding Non-Circularity	≤ 1.0%
Colored Fiber Diameter	250 ± 15 µm
Core Diameter	8.3 µm
Index of Refraction	0.33%
Core/Cladding Concentricity	≤0.8 µm
Mode Field Diameter	8.4 ± 0.6 µm @ 1550 NM
Dynamic Fatigue Parameter (nd)	□ 20
Static Fatigue Parameter (ns)	□ 20
Fiber Curl	≥ 2 meters
Macrobend (1 turn, 32 mm dia.)	≤ 0.5 dB at 1550 NM
Minimum Proof Strength	100,000 psi
Maximum Attenuation	.40 dB/km @ 1310 NM .30 dB/km @ 1550 NM
Zero Dispersion Wavelength	Not Applicable
Dispersion Slope	Not Applicable
Dispersion (Absolute)	1.0 to 5.0 ps/NM-km from 1550nm to 1565nm
Fiber Cutoff Wavelength	≤ 1150 NM. ≤ 1350 NM
Cbl. Cutoff Wavelength	≤ 1260 NM
Fiber Macrobend (100 turns @ 32 mm diameter)	≤ 0.05 dB @ 1310 NM ≤ 0.10 dB @ 1550 NM
Coating Strip Force	1.3 N □ F □ 8.9 N

- K. Product Specification:
1. Outside Plant Cables: Belden, BerkTek or equal, Single mode with buffer/fan-out kits as required.
 2. Building Cables: Belden, BerkTek or equal.

2.7 FIBER PATCH CORDS

- A. Fiber patch Cords shall be available in either Singlemode or Multimode.
- B. Construction shall be either 3.0 mm cordage or 1.6mm cordage.
- C. Connectors shall be available in Duplex LC or MTRJ.
- D. The 50-micron multimode fiber optic solution and single mode fiber optic solution shall utilize factory- made patchcords.
- E. Product Specification: Leviton, Belden or equal.

2.8 FIBER DISTRIBUTION CENTER (FDC)/FIBER PATCH PANEL

- A. Fiber Patch Panels - Combination Shelf:
 1. The Combination Shelf is a wall or frame mounted unit that terminates, provides cross connection, interconnection, splicing and fiber identification for up to 48 fiber strands. The shelf will provide protection from mechanical stress on the cable and fibers and from macro-bending losses:
 - a. The shelf shall be wall or rack mountable depending on the location requirement. The units must fit into a 19” wide frame arrangement and have a jumper routing trough.

- b. When wall mounted the shelf shall consist of a modular enclosure with front access and can be fully administered from the front. When rack mounted the shelf shall consist of a modular enclosure with front and rear access and can be fully administered from the front and rear. The unit shall slide out to allow access from the top. Include splice organizers and fiber breakout kits as required.
- c. The shelf shall have a translucent, removable cover over the connector panels. The connector panels shall snap into the front of the shelf and accommodate LC, or MTRJ connectors as required.
- d. Miscellaneous:
 - 1) UL Listed for Fire Safety.
 - 2) ISO 9001 Certified Manufacturer.
- e. Fiber patch panel/shelf shall be labeled according to the Owner's specific requirements.
- f. Product Specification: Leviton, Belden or equal.

2.9 FIBER OPTIC CONNECTORS

- A. Fiber Optic Connectors:
 - 1. Provide a field installable singlemode or multimode type connectors to terminate fiber optic cables from cable-to-cable, cable-to-equipment or equipment-to-equipment, and to make jumpers. Fiber connectors shall be LC:
 - a. The connector must:
 - 1) Be field installable.
 - 2) Be capable of mounting on either 250 um fiber or 900 um buffered fiber.
 - 3) Utilize a no-polish and no-epoxy system.
 - 4) Meet EIA and IEC standards for repeatability.
 - 5) Typical insertion loss 0.1dB. Maximum insertion loss 0.5dB.
 - 6) Be available in LC and MTRJ styles.
 - 7) Connector shall have a factory-polished fiber stub in the ferrule.
 - 8) Connector shall have a translucent back section allowing the use of a visual fault locator to help determine fiber contact during installation.
 - 9) Have a locking feature to the coupler and assure non-optical disconnect.
 - 10) Miscellaneous:
 - a) UL Listed for Fire Safety.
 - b) ISO 9001 Certified Manufacturer.
 - b. Product Specification: Leviton, Belden or equal.

2.10 COPPER CABLING

- A. Outside Plant Copper Cables:
 - 1. All voice grade wire and cable placed in the outside environment shall be solid, twisted pair, and multi-conductor. The copper twisted pairs shall have a mutual capacitance at 1kHz of 15.7 nF/1,000 ft. The cable shall be resistant to mechanical damage, lightning or damage from wildlife.
 - 2. The aerial air core cable shall be a self-supporting or lashed cable consisting of plastic-insulated solid conductors covered by a plastic core wrap and surrounded by an inner polyethylene jacket, a corrugated aluminum shield, a corrugated steel wrap and a bonded polyethylene jacket (PASP).
 - 3. The buried or underground cable shall have an aluminum steel polyethylene (ASP) sheath and a core of solid-copper conductors, dual insulated with foam skin and plastic, surrounded by FLEXGEL III filling compound.
- B. The multi-pair copper cables shall meet the following specifications:
 - 1. Physical Specifications:

Gauge	24 AWG
Pair Size	25 to 1,800

2. Electrical Specifications:

DC Resistance	27.3Ω/1000ft (8.96Ω/100m), maximum
Mutual Capacitance (@ 1kHz)	15.7 nF/1000ft (5.15 nF/100m) (25 pair), maximum
Impedance	100 Ω (25 pair)

Buried/Underground Cable Attenuation (db/1,000ft [305m]):	
at 772 kHz	5.6 (25 pair), maximum
at 1.0 MHz	6.4 (25 pair), maximum

Aerial Cable Attenuation (dB/1,000 ft [305m]):	
at 772 kHz	5.9 (25 pair), maximum
at 1.0 MHz	6.7 (25 pair), maximum

3. ISO 9001 Certified Manufacturer:

- a. Belden, Superior Essex or equal:
 - 1) Buried/Underground: CSIANMW.
 - 2) Aerial: CSI BKMP (self-support), CSI BKMA (lashed), CSI BKMH (lashed).

C. Copper Riser Cables:

- 1. Shielded or unshielded 24 AWG multi-pair copper cables shall be used as the vertical riser cables. The cable shall support voice, data and building service applications. The bending radius and pulling strength requirements of all backbone cables shall be observed during handling and installation. The multi-pair copper cables shall be in plenum or riser rated form and placed in conduit as required:

- a. Shielded. The shielded cable, 200 pair or more, shall consist of solid-copper conductors insulated with expanded polyethylene covered by a PVC skin, be UL and Listed as CMR. The core shall be overlaid with a corrugated aluminum sheath, which is adhesively bonded to an outer jacket of PVC plastic to form an ALVYN sheath. The copper riser cable shall meet or exceed the following electrical specifications listed below:

- 1) Electrical Specifications:

Average DC Resistance	26.5Ω/1,000ft (8.7Ω/100m), maximum
Average DC Resistance Unbalance	1.7%, maximum
Mutual Capacitance @ 1kHz	16 nF/1000ft (5.25 nF/100 m), maximum
Capacitance Unbalance (pair to ground)	201pF/1,000ft (65.94 pF/100m) maximum

- 2) Attenuation (dB/100 m [328 ft.]):

Frequency	Attenuation (Max.)
01.00 MHz	02.3 dB
04.00 MHz	04.9 dB
10.00 MHz	08.5 dB

16.00 MHz	12 dB
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3) Worst Pair Near-End Crosstalk (NEXT) dB/100 m [328 ft]:

Frequency	Pair-To-Pair NEXT (Max.)
1.0 MHz	13.8 dB
4.0 MHz	11.2 dB
10.0 MHz	10.2 dB
16.0 MHz	09.2 dB

- 4) The PVC sheath shall have improved frictional properties, allowing it to be pulled through conduit without the use of lubricants.
 - 5) The cable shall be available in 25, 50, 100, 150, 200, 300, 400, 600, 900, 1200, 1500, and 1800 pair counts.
 - 6) Miscellaneous:
 - a) UL Listed for Fire Safety.
 - b) ISO 9001 Certified Manufacturer.
 - 7) Product Specification: Belden, Superior Essex or equal, ARMM-type cable.
- b. Non-shielded. The non-shielded non-plenum cable shall consist of 24-AWG solid-copper conductors insulated with color coded PVC, 25 pair cable shall be UL Verified The non-shielded cable shall be available in 25, 50, 75 and 100 pair. The copper cable shall meet or exceed the following electrical specifications listed below:

1) Electrical Specifications:

Maximum DC Resistance	28.6 Ω /1,000ft (9.4 Ω /100m)
Maximum DC Resistance Unbalanced	5%
Maximum Capacitance Unbalanced (pair to ground)	1,000 pF/1000 ft. (328 pF/m)
Mutual Capacitance @ 1kHz	18 nF/1000 ft (5.9 nF/100 m), maximum

2) Attenuation (dB/100 m [328 ft.]):

Frequency	Attenuation (Max.)
1.00 MHz	2.3 dB
4.00 MHz	4.9 dB
10.00 MHz	8.5 dB
16.00 MHz	12 dB

3) Worst Pair Near-End Crosstalk (NEXT) dB/100 m [328 ft]:

Frequency	Pair-To-Pair NEXT (Max.)
1.0 MHz	13.8 dB
4.0 MHz	11.2 dB
10.0 MHz	10.2 dB
16.0 MHz	9.2 dB

- 4) Miscellaneous:
 - a) UL Listed for Fire Safety.
 - b) ISO 9001 Certified Manufacturer.
- 5) Product Specification: Belden, Superior Essex or equal, ARMM-type cable.

2.11 VOICE CIRCUIT TERMINATIONS IN THE TELECOMMUNICATIONS CLOSETS

- A. The wiring block shall be 110 -type and support Category 3, 5e and 6 applications and facilitate cross connection and interconnection using either cross connect wire or the appropriate category patchcords:
1. The wiring blocks shall be fire retardant, molded plastic consisting of horizontal index strips for terminating 25 pairs of conductors each. These index strips shall be marked with five colors on the high teeth, separating the tip and ring of each pair, to establish pair location. A series of fanning strips shall be located on each side of the block for dressing the cable pairs terminated on the adjacent index strips.
 2. The wiring blocks shall accommodate 22- through 26-AWG conductors and shall be able to mount directly on wall surfaces either with or without backboards or on a 24" free-standing frame.
 3. Clear label holders with the appropriate colored inserts shall be provided with the wiring blocks. The insert labels shall contain vertical lines spaced on the basis of circuit size (3-, 4-, or 5-pair) and shall not interfere with running, tracing or removing jumper wire/patch cords. Labels shall be color-coded and machine labeled/numbered according to Owner's requirements.
 4. The wiring blocks shall be available in 50, 100, and 300 pair sizes. The 100 and 300 pair wiring blocks shall be available with or without legs. The legs allow the cables to pass behind the wiring block and fan out to each side. The space created by the feet, on each side of the block, allows it to be used as a vertical jumper trough. The 50 pair size is not available with legs and shall be utilized for low pair count and/or depth restrictive situations.
 5. The wiring block shall be able to accommodate over 500 repeated insertions without incurring permanent deformation and it shall pass the reliability test of no more than one contact failure in 10,000 connections.
 6. The 110 wiring blocks shall meet the following specifications:
 - a. Physical Specifications:
 - 1) Height:
 - a) 25/50-Pair – 1.75 in. (4.45 cm).
 - b) 100-Pair – 3.6 in. (9.12 cm).
 - c) 300-Pair, 10.8 in. (27.41 cm).
 - 2) Width:
 - a) With legs: 10.7 in. (27.23 cm).
 - b) Without legs: 8.5 in. (21.60 cm).
 - 3) Depth:
 - a) With legs: 3.2 in. (8.25 cm).
 - b) Without legs: 1.4 in. (3.60 cm).
 - 4) Electrical Specifications:
 - a) ANSI/TIA/EIA Category 5e, 6.
 - 5) For each wiring block shown on the drawings, provide and install 110 type 4-pair or 110 type 5-pair connecting blocks for each horizontal index strip on each wiring block. For example, a 300 pair wiring block serving station cables requires 72 4-pair connecting blocks. A 300 pair wiring block serving riser pairs requires 60 5-pair connecting blocks.
- B. Voice MDF/IDF Rooms, or as otherwise indicated on drawings, locations shall be equipped with termination blocks for termination of voice station and host cable pairs. Voice cable blocks shall consist of a minimum 100 pair. All blocks shall be securely fastened to the room backboards or equipment racks – see drawings. Provide all required D-rings, ladder tray or other approved cable guides as required to provide a neat installation. All cables shall terminate in numerical sequence.

2.12 PROTECTORS

- A. All copper circuits shall be provided with protection between each building with an entrance cable protector panel(s). All building-to-building circuits shall be routed through this

protector(s). The protector(s) shall be connected with a #6 A WG copper bonding conductor between the protector ground lug and the MDF/IDF ground point.

- B. Plug in Surge Protection Modules shall be provided for each pair terminated on the chassis. Protector module shall be solid-state type unless otherwise noted:
 - 1. 240VDC/300VDC solid-state protector modules shall provide transient and power fault protection for standard telephone line applications. The modules shall be fast acting, self-resetting current limiters to protect against sneak current type faults. These modules shall be UL Listed with integrated test points and Black in color.
 - 2. 30VDC/75VDC solid-state protector modules shall provide transient and power fault protection for digital and data line applications. The modules shall be fast acting, self-resetting current limiters to protect against sneak current type faults. These modules shall be UL Listed with integrated test points and Red in color.
 - 3. In the event that protector modules are not called out in the drawings, SCS Contractor shall include all costs in base bid to provide the 75v solid-state modules w/sneak current protection. Confirm module color with Owner's Engineer prior to ordering. In all cases, SCS Contractor is responsible to coordinate appropriate module with Owner prior to ordering material.
- C. Product Specification: Circa, Emerson, or Marconi.

2.13 GROUNDING SYSTEM AND CONDUCTORS

- A. The SCS Contractor shall utilize a Telecommunications Bonding Backbone (TBB) as provided by the Electrical Contractor. The SCS Contractor shall terminate TBB cable(s) on SCS Contractor provided ground busbars located at each MDF/IDF Room, or as otherwise indicated on the drawings. Ground busbars shall be ANSI-J-STD-607-A compliant and UL Listed. Busbars shall be Chatsworth # 40153-012 (equal by Harger) or as noted on the drawings. Wall mounted cabinets require a horizontal rack busbar (Chatsworth #10610-XXX) equal by Harger). All communication system bonding and grounding shall be in accordance with the ANSI, the CEC, and NFPA.
- B. Horizontal cables shall be grounded in compliance with ANSI/CEC and local requirements and practices.
- C. Horizontal equipment including cross connect frames, patch panels, cable trays, equipment racks, ladder trays, conduits, active telecommunication equipment, test apparatus and equipment shall be bonded to the TBB ground bus bars utilizing a #6-AWG and 2-hole crimp type grounding lugs. All connections shall be bare metal to bare metal using appropriate antioxidant compound. Burndy mechanical-type grounding lugs and terminals are prohibited. Minimize the length and number of bends of the grounding conductors to the busbar. Attachment to every rack and cabinet shall be made by one of the following methods:
 - 1. Wall mounted IDF cabinets- Attach ground conductor's 2-hole compression lug to the rear rail's top holes of the rack, or front rail's top hole of the cabinet, using either two (2) tri-lobular thread-forming screws (not self-tapping or sheet metal screws) or by using two (2) standard bolts with two (2) "Type B" internal-external tooth lock washers per bolt. If thread-forming screws are not used, remove paint at the connection point and use an approved anti-oxidant prior to attaching the ground conductor.
 - 3. Cabinet/Rack ground busbar- Install a dedicated copper horizontal ground busbar strip at the top of the rear rail of the rack and cabinet. Attach ground conductor's 2-hole compression lug to this ground strip using either tri-lobular thread-forming screws (not self-tapping or sheet metal screws) or by using two (2) standard bolts with two (2) "Type B" internal-external tooth lock washers per bolt.
- D. The SCS Contractor shall be responsible for providing an approved ground at all newly

installed distribution frames, and/or insuring proper bonding to any existing facilities. The SCS Contractor shall also be responsible for ensuring ground continuity by properly bonding all appropriate cabling, cable sheaths, circuit protectors, closures, cabinets, service boxes, and framework.

- E. SCS Contractor shall label both ends of each grounding conductor as close as practical to the point of termination in a readable position. Ground tag must indicate the location of both ends of the ground conductor (e.g. Rack#1 to TMGB) and tag must include the warning “If this connector or cable is loose or must be removed, please call the District Telecommunications Manager”.

2.14 EQUIPMENT RACKS

- A. When shown on drawings, communication closets shall be equipped with floor mounted equipment racks provided by the SCS Contractor to provide termination bays for the multiple cable types in addition to shelves, panels, power strips, etc. The racks shall be made of lightweight aluminum, UL Listed, and include mounting hardware for mounting specified termination equipment to the frame. In addition, the mounting hardware must provide vertical and horizontal wireways for cross-connect wire.
- B. Equipment racks, ladder trays and rack mount accessories shall be Black in color unless otherwise noted.
- C. Floor mounted open racks shall be secured from the base to the structural floor to prevent movement, and secured to ladder tray sections installed above. Fasteners installed to the structural floor shall be torqued to the “fastener manufacturer’s” recommendation. Racks mounted on raised floors shall be seismically braced to the structural floor below the raised floor to the satisfaction of DSA, and all local, state and federal requirements.
- D. All racks shall be individually grounded to the isolated ground busbar (TMGB, TGB) within the equipment room using a 2-hole compression ground lug and #6 jacketed green cable. Ground wire shall be run as straight as possible, with the length kept as short as possible. Ground wire shall be neatly bundled and secured to the rack and ladder tray. Daisy chaining a ground wire between racks or to other components is not allowed.
- E. Product Specification: Chatsworth, Southwest Data Products, or UL listed and approved equal.

2.15 EQUIPMENT CABINETS

- A. When shown on drawings, communication closets shall be equipped with equipment cabinets to house Owner-provided equipment.
- B. Equipment cabinets and accessories shall be Black in color unless otherwise noted.
- C. Floor mounted cabinets shall be secured to the structural floor to prevent movement using manufacturer recommended floor anchor brackets and fasteners. Fasteners installed to the structural floor shall be torqued to the “fastener manufacturer’s” recommendation.
- D. Cabinets shall be configured per the Owner’s Project Manager’s direction.
- E. All cabinets shall be individually grounded to the isolated ground busbar (TMGB, TGB) within the equipment room using a 2-hole compression ground lug and #6 jacketed green cable. Wall mounted cabinets require a horizontal rack busbar (Chatsworth #10610-XXX, equal by Harger) installed at the top position of the front rails. Attach ground lug to this

horizontal busbar. Ground wire shall be run as straight as possible, with the length kept as short as possible. Ground wire shall be neatly bundled and secured to the cabinet and ladder tray. Daisy chaining of ground wire between cabinets or to other components is not allowed.

- F. Cabinets mounted on raised floors shall be seismically braced to the structural floor below the raised floor to the satisfaction of DSA and all local, state and federal requirements.
- G. Product Specification: Chatsworth, Southwest Data Products, or UL Listed and approved equal.

2.16 WIRELESS ACCESS POINTS

- A. Acceptable manufacturer's: Aerohive Networks or equivalent fully compatible equipment.
- B. Interior Wireless Access Points shall meet the following requirements:
 - 1. Support 802.11n 3x3 MIMO with 450 Mbps Data Rate per radio.
 - 2. Contain (Qty 2) 802.11n radios per access point and support 2.4 GHz and 5 GHz.
 - 3. Utilize omni-directional antennas.
 - 4. Contain two Gigabit Ethernet uplink ports.
 - 5. Provide built-in classroom management controls to enable a teacher to manage wireless access in the classrooms (i.e. on a per classroom basis a teacher can see how many students connected, allow or deny students access to Internet and direct students to specific web pages).
 - 6. Contain ability to route Apple Bonjour traffic between VLANs (i.e. connect iPad on student VLAN1 to AppleTV on teacher VLAN2).
- C. Exterior Wireless Access Points shall meet the following requirements:
 - 1. Support 802.11n 3x3 MIMO with 450 Mbps Data Rate per radio.
 - 2. Contain (Qty 2) 802.11n radios per access point and support 2.4 GHz and 5 GHz.
 - 3. Utilize omni-directional antennas.
 - 4. Contain one Gigabit Ethernet uplink ports.
 - 5. Provide built-in classroom management controls to enable a teacher to manage wireless access in the classrooms (i.e. on a per classroom basis a teacher can see how many students connected, allow or deny students access to Internet and direct students to specific web pages).
 - 6. Contain ability to route Apple Bonjour traffic between VLANs (i.e. connect iPad on student VLAN1 to AppleTV on teacher VLAN2).
- D. Wireless access points shall be provided as indicated on drawings provided and per these specifications. Prior to installation, verify exact locations of equipment to be installed with District in field prior to rough-in.

2.17 INTERCOM-PUBLIC ADDRESS-CLOCK SYSTEM

- A. Acceptable Manufacturers:
 - 1. All equipment listed herein will be by:
 - a. Intercom/PA/Clock components: Advanced Network Devices speaker/clocks.
- B. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.
- C. The functions and features specified are vital to the operation of this facility. Therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the Contractor from strict compliance with the requirements of this specification.

- D. See Quality Assurance section of this specification for additional product substitution requirements.
- E. All structured cabling system components required for the proper operation of this system, including cabling and connectivity, shall conform to the Structured Cabling System Products listed elsewhere in this document.
- F. Equipment:
 - 1. Advanced Network Devices IPSWD-RWB wall speaker clocks.
 - 2. Advanced Network Devices IPS-SM1 enclosure for surface mount applications.
 - 3. Advanced Network Devices IPS-FM1 enclosure for flush mount applications.
 - 4. Category-6 cable individually home run for each device.
 - 5. All cat 6 cabling shall be certified and violet or purple in color.
 - 6. The Contractor shall furnish all patch cables that are used in this Project.
 - 7. All equipment shall be installed in a rack-mounted cabinet with a locking security door.
- G. Device Selection/Installation:
 - 1. Each classroom should have an IPSWD-RWB installed in a surfaced mounted box on the wall indicated on the technology floor plans.
 - 2. All clock and speakers shall be installed per the manufacturer's recommendation.
 - 3. All wall penetrations and clock & speaker locations that are in plain sight and not covered by a replacement clock speaker combo or outdoor speaker shall be patched and painted to match existing wall.
 - 4. Contractor to ensure that bell schedules are programmed, and that a manual bell and public announcement can be accomplished through the existing VoIP telephone system.
 - 5. Bell sounds shall be clear of any distortion, and at an acceptable level based on ambient noises.
 - 6. Contractor to provide two (2) spare interior speaker/clock combos at the completion of the project to the maintenance and operations audio visual department

2.18 TERMINAL BACKBOARDS

- A. Where indicated on drawings, provide new plywood terminal backboards. Use Douglas Fir Plywood, A/C grade, finished one side and prime coat painted on all surfaces with a finish coat of fire retardant intumescent white enamel. On each plywood sheet leave one (1) Fire Marshal Stamp unpainted for inspection. Unless otherwise indicated, use 8'-0" high x length as shown on drawings x 3/4" thick plywood. See backboard elevations for more information.

2.19 UNSPECIFIED EQUIPMENT AND MATERIAL

- A. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete and functional SCS installation shall be provided in a level of quality consistent with other specified items.

2.20 FIRE RATED PATHWAY

- A. The firewall through-penetration shall be a manufactured, UL Classified, firestop device / system designed to allow cables to penetrate fire-rated walls with a built-in fire sealing system that automatically adjusts to the amount of cables installed.
- B. The fire stopping device shall be capable of installation in new construction or retrofit in existing structures.
- C. The device shall be UL Tested and Classified in accordance with ASTM E814 (UL 1479)

and with ratings up to and including 2 hours.

- D. Manufacturer: Specified Technologies Inc., EZ-Path (#EZDP33FW) or equal by Wiremold.

2.21 UNINTERRUPTABLE POWER SUPPLY

- A. Provide the following Tripp Lite UPS products or equivalent at each MDF and IDF location. Contractor shall install and test each UPS component per the manufacturer's directions.
 - 1. ALL IDFs:

1	SU1000RTXL2UA	1000VA, On-Line, rack mount UPS
1	SNMPWEBCARD	Management card- connects UPS to network
2	BP24V70-3U	External battery pack

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. 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 Owner's Project Manager before making any changes. It shall be the responsibility of the manufacturer-authorized distributor of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.
- B. Furnish all conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.
- C. The cables within the rack or cabinets shall be numbered for identification using machine generated labels.
- D. Splices of cables are not acceptable.
- E. 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's Project Manager to engage in the installation and service of this system.
- F. 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 created in the course of this project. The Contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., caused by the performance of this work.
- G. The system must meet all local and other prevailing codes.
- H. All cabling installations shall be performed by qualified technicians.
- I. In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a special tool.
- J. Cable lubricants (i.e. Polywater) shall be used to reduce the cable pull tension stated by the cable manufacturer during cable installation in conduits and innerduct. Contractor shall

verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant. Lubricants that harden after installation are not allowed. Submit all proposed lubricants for approval PRIOR to use on low voltage, A/V, coax, fiber, and data cables. Cable lubricants shall be allowed to dry a minimum of 15 days before performing certification tests.

- K. Under no circumstance are "channel locks" or other pliers to be used to install or terminate cables.
- L. Cables may be run exposed above ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The Contractor shall include all costs in base bid for any additional supports/seismic bracing required by the Local Authority having Jurisdiction. The cables shall not be laid directly on the ceiling panels. The use of hook and loop ties shall be done in accordance with the cable manufacturer's requirements. The cable jacket composition must meet local and all other prevailing fire and safety codes.
- M. All firewalls penetrated by structured cabling shall be sealed by use of a non-permanent fire blanket or other method in compliance with the current edition of NFPA and the CEC or other prevailing code and must be a system listed by UL. The Contractor must not use concrete or other non-removable substance for fire stopping on cable trays, wireways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area. This requirement also applies to maintaining fire ratings of all floors penetrated by conduits or devices designated for use by voice and data cabling.
- N. All equipment racks shall be bolted to the structural floor by the SCS Contractor in the location shown on drawings. Wall mounted relay rack and wall mounted cabinet kits shall be screwed to studs, not drywall.
- O. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor before final acceptance at no cost to the Owner.
- P. The cable manufacturer's minimum bend radius and maximum pulling tension shall not be exceeded.
- Q. Cable raceways, when required, shall not be filled greater than the CEC maximum fill for the particular raceway type.
- R. Roof penetrations are prohibited. No conduit shall be installed on roofs or route horizontally on exterior walls.

3.2 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

- A. All communication cabling used throughout this project shall comply with the requirements as outlined in the CEC Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear UL listed type CMP (Plenum Rated) and/or CM/G (General Purpose) and/or CMR (Riser Rated). All fiber optic cabling shall bear OFNP (Plenum Rated) and/or OFNR (Riser Rated) and/or OFN/G (General Purpose). SCS Contractor is responsible for installing appropriately rated cable for the environment in which it is installed.
- B. Cable Pathways:
 - 1. In suspended ceiling, accessible ceiling, and raised floor areas where duct, cable trays or conduit are not available, the Contractor shall bundle, in bundles of 48 or less, station or other cabling with half inch hook and loop strips, but not deforming the cable

- geometry. Cable bundles shall be supported via "J" hooks attached to the existing building structure and framework at a maximum of five (5) foot intervals. Plenum rated hook and loop ties will be used in all appropriate areas. In areas where two or more bundles are traveling in close proximity, utilize a Chatsworth Rapidtrak Cable support system. The Contractor shall adhere to the manufacturers' requirements for bending radius and pulling tension of all cables.
2. Cables or J-hooks shall not be attached to lift out ceiling grid supports or laid directly on the ceiling grid.
 3. Cables or J-hooks shall not be attached to or supported by fire sprinkler heads, HVAC ducts, or delivery systems or any environmental sensor located in the ceiling air space.
 4. Where additional conduit(s)/sleeve(s) are required, but not provided by the electrical Contractor, the SCS cabling Contractor shall be responsible to provide such conduit(s)/sleeve(s). Conduit(s) and sleeve(s) shall be of suitable material, sized, installed, fire-stopped, and grounded as required by the CEC, ANSI/TIA standards and all other applicable codes and standards. Any conduit(s) and sleeve(s) added by the SCS Contractor shall be approved by the Owner's Project Manager prior to rough-in.
 5. All J-hooks shall be rated and designed for CAT6 cabling.
- C. Sealing of openings between floors, into or through rated fire and smoke walls, existing or created by the Contractor for placement of new or removal of old cable into or through shall be the responsibility of the Contractor. Sealing material (Approved UL listed system) and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the Contractor's work. Any openings created by or for the Contractor and left unused shall also be sealed as part of this work:
1. Firestopping work shall be performed by a single Contractor to maintain consistency and accountability on the project.
 2. The Contractor shall install penetration firestop seal materials in accordance with design requirements, and manufacturer's instructions.
 3. The Contractor's installer shall be certified, licensed or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.
 4. All installed through penetration firestops shall be identified via label, or stencil. Label shall state that the fill material around the penetrating item is a firestop, and that it shall not be disturbed unless by an authorized Contractor. The label shall include the firestop brand name, and the classified system number for which it was installed.
 - a. Sample Label: MANUFACTURER'S NAME:

ATTENTION

Fire Rated Assembly

For Any Changes to This System, Please Refer to UL System Listed Below

PRODUCT:

HOUR

RATING: UL

SYSTEM:

INSTALLATION DATE:

INSTALLED BY:

LICENSE NUMBER:

PHONE:

FAX:

- D. The Contractor shall be responsible for damage to any surfaces or work disrupted as a

result of his work. Repair of surfaces, including painting, shall be included as necessary.

- E. Cable bundles within the MDF/IDF shall be dressed into bundles of no more than twenty-four (24) cables. Maintain each bundle with half inch-wide hook and loop strips spaced every 12 inches maximum.
- F. The Contractor shall install all patch cords per direction of the Owner's project manager in a neat and systematic fashion. Prior to installing all patch cords, the Contractor shall install patch cords in a single rack to demonstrate work practices to the Owner's project manager. Only after any corrections/modification to the installation as directed by the Owner's project manager, may the Contractor continue installing the patch cords in the remaining racks.
- G. Each equipment cabinet and rack requires its own dedicated grounding connection to the grounding infrastructure. Grounding infrastructure shall consist of a dedicated #6 AWG (min.) green conductor from every rack/cabinet back to the TMGB/TGB. All ground conductor attachments to the TMGB/TGB shall utilize 2-hole compression lugs. See Section 2.13 Grounding System and Conductors of this document for more information.
- H. In raised-floor environments, the ground conductor shall attach to the lowest holes on the front rail of each rack/cabinet.
- I. Rack/cabinet mounted equipment shall be grounded via the chassis, in accordance with manufacturer's instructions. The equipment chassis shall be bonded to the rack/cabinet using one of the following methods:
 - 1. If the equipment has a separate grounding hole or stud, use a #10-AWG ground wire from the chassis ground hole/stud to the rack grounding bus.
 - 2. If the manufacturer suggests grounding via the chassis mounting flanges, use tri-lobular thread-forming screws (not self-tapping or sheet metal screws) to attach the equipment to the rack/cabinet rails. If the equipment mounting flanges are painted, remove the paint and apply an anti-oxidant, or use tri-lobular thread-forming screws and two (2) "Type B" internal-external tooth lock washers to safely ground equipment to the rack.
- J. Bonding of ladder tray sections- Attach bonding straps to each ladder tray section by utilizing either two (2) tri-lobular thread-forming screws (not self-tapping or sheet metal screws) or by using two (2) standard bolts with two (2) "Type B" internal-external tooth lock washers per bolt. If thread-forming screws are not used, remove paint at each connection point and use an approved anti-oxidant prior to attaching the bonding strap.
- K. All installation shall be done in conformance with BICSI TDMM guidelines and manufacturer's installation guidelines. The Contractor shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius during the placement of the facilities. Failure to follow the appropriate guidelines will require the Contractor to provide, in a timely fashion, any additional material and labor necessary to properly rectify the situation to the satisfaction and written approval of the Owner's Project Manager. This shall also apply to any and all damages sustained to the cables by the Contractor during the implementation:
 - 1. Bonding and Grounding: The Contractor shall be responsible for providing an approved ground at all distribution frames. The Contractor shall also be responsible for ensuring ground continuity by properly bonding all appropriate cabling, closures, cabinets, service boxes, and framework. All grounds shall consist of #6-AWG copper wire and shall be supplied from an approved building ground and bonded to the main electrical ground. All cable sheaths and splice cases shall be grounded to a Telecommunications Ground Bus. All grounding must be in accordance with the CEC, NFPA, ANSI, and all local codes and practices. The Electrical Contractor shall be responsible for providing a properly sized grounding conductor from the main electrical ground to the

telecommunications ground bus in each MDF/IDF room. The SCS Contractor shall be responsible to provide the telecommunications busbar, attach the Electrical Contractor-provided ground conductor, and bond all required equipment and components within each MDF/IDF to the busbar.

2. Power Separation: The Contractor shall not place any distribution cabling alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus.
3. Miscellaneous Equipment: The Contractor shall provide any necessary screws, anchors, clamps, hook & loop ties, distribution rings, wire molding (MDF & IDF locations), miscellaneous grounding and support hardware, etc., necessary to facilitate the installation of the System.
4. Special Equipment and Tools: It shall be the responsibility of the Contractor to furnish any special installation equipment or tools necessary to properly complete the System. This may include, but is not limited to, tools for terminating cables, testing and splicing equipment for copper/fiber cables, communication devices, jack stands for cable reels, or cable winches.
5. Labeling: The Contractor shall be responsible for printed labels for all pull boxes, conduits, cables, protectors, racks, cabinets, patch panels, connector panels, cords, distribution frames, and out let locations, according to the specifications. No labels are to be written by hand. Contractor shall submit sample of all labeling schemes for Owner's consideration and approval. Final label scheme shall be by direction and approval of the Owner.
6. Cable Storage: The Contractor shall not roll or store cable reels without an appropriate underlay and the prior written approval of Owner's Project Manager.
7. Cable Records: The Contractor shall maintain conductor polarity (tip and ring) identification at the main equipment room (switch room), risers, and station connecting blocks in accordance with industry practices, but only in locations authorized by the Owner's Project Manager. Contractor to provide spread sheet for all outdoor backbone and indoor riser backbone cables tested.

3.3 STRUCTURED CABLING AND INTERCOM-PUBLIC ADDRESS-CLOCK GENERAL INSTALLATION DESCRIPTION

- A. The structured cabling system shall consist of any or all of the following subsystems:
 1. Work Area Subsystem.
 2. Horizontal Subsystem.
 3. Administration Subsystem.
 4. Backbone Subsystem.
 5. Equipment Subsystem.
- B. Work Area Subsystem:
 1. The Work Area Subsystem provides the connection between the information outlet and the station equipment in the work area. It consists of cords, adapters, and other transmission electronics:
 - a. Contractor shall supply the wiring or cords that connect terminal devices to information outlets. This includes mounting cords and connectors, as well as extension cords.
- C. Horizontal Subsystem:
 1. The Horizontal Subsystem provides connections from the horizontal cross connect to the information outlets (IOs) in the work areas. It consists of the horizontal transmission media, the associated connecting hardware terminating this media and IOs in the work area. Each floor of a building is served by its own Horizontal Subsystem:
 - a. Horizontal Cabling:
 - 1) Contractor shall supply horizontal cables to connect each information outlet to the backbone subsystem as shown on the drawings.
 - 2) Unless otherwise noted on the floor plans or within this document, the type of

horizontal cables used for each work location shall be 4-pair unshielded twisted pair (UTP).

- 3) The 4-pair UTP cables shall be run using as star topology format from the administration subsystem to every individual information outlet. All cable routes, other than those dictated on the drawings, are to be approved by Owner's Project Manager prior to installation.
- 4) The length of each individual run of horizontal cable from the administration subsystem to the information outlet shall not exceed 295-ft (90 m).
- 5) Contractor shall observe the bending radius and pulling strength requirements of the 4-pair UTP cable during handling and installation.
- 6) Each run of cable between the termination block and the information outlet shall be continuous without any joints or splices.
- 7) All station cable shall be placed in the interior of walls unless otherwise noted or obstructed.
- 8) In the event Contractor is required to remove ceiling tiles, such Work shall not break or disturb grid. Removal of the ceiling grid must be coordinated with the Owner's Project Manager. All insulation shall be replaced in its original location.
- 9) Avoid electromagnetic interference (EMI) by maintaining adequate physical separation between telecommunications cabling and possible sources such as, but not limited to, electric motors, electric erasers, electric pencil sharpeners, transformers, fluorescent lighting that share distribution space with telecommunications cabling, copiers that share work area space with line cords and terminals, large fax machines and power cords that supports such equipment.
- 10) Contractor shall provide Owner's Project Manager with detailed cable run diagrams for cable runs within raised floors (if shown on plans) detailing exact locations of cable for review and written approval by Owner's Project Manager.
- 11) Conduit runs installed by the Contractor should not exceed 100 feet or contain more than two 90 degree bends without utilizing appropriately sized pull box. Pull boxes are not to be used in lieu of a bend.
- 12) Station cables and tie cables installed within ceiling spaces shall be routed through these spaces at right angles to electrical power circuits.
- 13) Each station cable shall have 1 meter of service slack configured in an "S" shape via J-hooks at rack or wall field end and 1 foot of service loop at station outlet end. Service slack shall be located within 15' of the MDF/IDF as required to maintain a neat and "workmanship like" installation.

D. Administration Subsystem:

1. The Administration Subsystem links all of the subsystems together. It consists of labeling hardware for providing circuit identification and patch cords or jumper wire used for creating circuit connections at the cross connects. All wall field layouts must be approved by Owner's Project Manager prior to rough-in and installation:
 - a. Separate termination fields shall be created for voice, data and building service applications.
 - b. Termination blocks that require rotation after connection of horizontal/vertical wiring will not be allowed.
 - c. Contractor shall supply cross-connect wire, patch cords and fiber patch cords for cross-connection and inter-connection of termination blocks and lightguide interconnection units.

E. Backbone Subsystem:

1. The main cable route within a building is called the Backbone Subsystem. It links the main distribution frame (MDF) in the equipment room to each intermediate distribution frame (IDF). It consists of the backbone transmission media between these locations

and the associated connecting hardware terminating this media. It is normally installed in a star topology, with first-level backbone cables beginning at the main cross connect. If needed, second-level backbone cables begin at intermediate cross connects.

2. The backbone subsystem shall include vertical runs (riser) of in-building cable between floors of a multi-story building, if applicable.
 3. All fibers will be run in innerduct and terminated in the MDF/IDF Rooms, or as otherwise indicated on drawings, with connectors, type as specified elsewhere, in rack mounted or wall mounted fiber patch panels equipped with sufficient panels, couplers and jumper storage shelves to terminate and secure all fibers. All innerduct (Carlou or equal) shall be corrugated and a minimum of $\frac{3}{4}$ " in diameter unless otherwise indicated on plans. Inner duct shall be plenum, riser or general rated as required by the environment in which it is to be installed.
 4. Contractor shall supply unshielded 23-AWG multi-pair copper cables and optical cables as the riser cables. The cable shall support voice and data applications. Contractor shall observe the bending radius and pulling strength requirements of all backbone cables during handling and installation.
- F. Equipment Room Subsystem: The Equipment Subsystem consists of shared (common) electronic communications equipment in the room or telecommunications closet and the transmission media required to terminate this equipment on distribution hardware.

3.4 DAMAGES

- A. The Contractor will be held responsible for any and all damages to portions of the building caused by it, its employees or sub-Contractors; including but not limited to:
1. Damage to any portion of the building caused by the movement of tools, materials or equipment.
 2. Damage to any component of the construction of spaces.
 3. Damage to the electrical distribution system.
 4. Damage to the electrical, mechanical and/or life safety or other systems caused by inappropriate operation or connections made by the Contractor or other actions of Contractor.
 5. Damage to the materials, tools and / or equipment of the Owner, its consultants, agents and tenants.

3.5 PENETRATIONS OF WALLS FLOORS AND CEILINGS

- A. Unless specifically shown on the drawings, the Contractor shall make no penetration of floors, walls or ceiling without the prior written approval of the Owner's Project Manager.
- B. Any penetrations through acoustical walls or other walls for cable pathways / cables shall be sealed by the Contractor in compliance with applicable code requirements and as directed by Owner's Project Manager.
- C. Any penetrations through fire-rated walls for cable pathways / cables shall be sealed by the Contractor as required by code and as directed by Owner's Project Manager. The Contractor shall be required to work together with the General Contractor and the Electrical Contractor to coordinate and develop all fire stopping methods prior to any cable installation. The Contractor shall also, prior to the commencement of on-site activities, submit to Owner's Project Manager, details of any special systems to be used.
- D. Roof penetrations are prohibited. No conduit shall be installed on roofs or route horizontally on exterior walls.

3.6 TESTING/WARRANTY

- A. Structured Cabling System and Intercom/PA/Clock IP System:
1. The Contractor shall provide competent, test equipment manufacturer-trained engineers and/or technicians, authorized by the manufacturer of the cabling system, to technically supervise and participate during all tests for the systems.
 2. The Contractor shall test and certify the cabling system to minimum standards as set forth in the TIA/EIA specifications for 100BaseTX Ethernet and for Category-6 cable, token ring, and 1000baseT signals.
 3. All cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. All conductors of each installed cable shall be verified usable by the Contractor before system acceptance. Any defect in the cable system installation including but not limited to cable, connectors, feed-through couplers, patch panels, splices, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
 4. Each cable shall be tested for continuity on all pairs and/or conductors. Twisted-pair voice cables shall be tested for length, continuity, pair reversals, opens, shorts, transpositions, presence of AC and DC voltages and opens using a "green light" type test set. Twisted-pair horizontal cables shall be tested for the all of the above requirements, plus tests that indicate installed cable performance. These cables shall be tested using a TIA/EIA Category-6 Level III / IEC 61935 Level III or better ETL certified cable tester/analyzer.
 5. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests.
 6. The test shall be recorded as pass/fail as indicated by the test set in accordance with the manufacturers recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested before final acceptance.
 7. Each installed cable shall be tested for installed length using a Time Domain Reflectometer (TDR) type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the TIA/EIA Standards. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number.
 8. Multi-pair cables, record the following tests on every cable pair in each multipair cable using a TDR type device: record the shortest pair length, continuity, pair reversals, shorts, opens, transpositions, presence of AC and DC voltage.
 9. Enhanced Category-6 data cable shall be performance verified using an automated test set. This test set shall be capable of testing for the continuity and length parameters defined above, and provide results for the following tests:
 - a. Attenuation (Insertion Loss).
 - b. Return Loss (RL).
 - c. Near End Crosstalk (NEXT) – measured at both ends of each cable pair.
 - d. Attenuation to Crosstalk Ratio (ACR).
 - e. Power Sum Near End Crosstalk (PSNEXT).
 - f. Power Sum Attenuation to Crosstalk Ratio (PSACR).
 - g. Far End Crosstalk (FEXT).
 - h. Equal Level Far End Crosstalk (ELFEXT).
 - i. Power Sum Equal Level Far End Crosstalk (PSELFEXT).
 10. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the ANSI/TIA/EIA Standard, and the result shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result, and the actual test result achieved.
 11. Optical Fiber Cable Testing:
 - a. All fiber testing shall be performed on all fibers in the completed end to end

system by test equipment manufacturer-trained engineers and/or technicians. There shall be no splices unless clearly defined in Section 3 of this specification or on the plan drawings. Testing shall consist of a bi-directional end to end OTDR trace performed per ANSI/TIA/EIA 526 series and a bi-directional end to end power meter test performed per ANSI/TIA 455 series. The system loss measurements shall be provided at 850 and 1300 nanometers for multimode fibers and 1310 and 1550 for single mode fibers:

- 1) Pre-installation cable testing: The Contractor shall test all lightguide cable prior to the installation of the cable. The Contractor shall assume all liability for the replacement of the cable should it be found defective during the warranty period.
 - 2) Loss Budget: Fiber links shall have a maximum loss of: (allowable cable loss per km) (km of fiber in link) + (.4dB) (number of connectors) = maximum allowable loss.
 - 3) Any link not meeting the requirements of the standard shall be brought into compliance by the Contractor, at no additional charge to Owner.
12. The Contractor shall provide test documentation to the Owner's Project manager in a three ring binder(s) and in CD format within three weeks after the completion of a specific project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by test type. A paper copy of the test results shall be provided that lists all the links that have been tested, and include link name, overall pass/fail evaluation, date and time of test, cable type and NVP value. Detailed test results shall be provided for each link tested and shall include length, propagation delay, delay skew, insertion loss, return loss, NEXT, ELFEXT, ACR, PSNEXT, PSELFEXT, and P SACR. Detailed test results for each link will also include customer site name, name of standard selected to execute the tests, date and time test results were saved in memory of test unit, brand name model and serial number of tester and revision of the tester software and test standards database in the tester. Individual test data within each section shall be presented in the sequence listed in the test summary records. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation.
 13. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the binder.
 14. The entire Intercom/PA/Clock system shall be warranted free of mechanical or electrical defects for a period of five years after final acceptance of the installation.
 15. Any Intercom/PA/Clock Any equipment that is not installed per the manufacturer's recommendation shall be replaced promptly and at no cost to the District.
 16. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the District.
 17. Contractor shall test all intercom/public address speaker volume levels in the presence of the District's representative. Contractor shall adjust all individual speaker sound levels to the satisfaction of the District's representative.
 18. The Intercom/public address system shall provide clear, natural sound uniformly distributed throughout the designated areas.
 19. Provide all labor and material warranties for each system, as described elsewhere in this document.
 20. At the District's direction, the Contractor shall perform additional random testing which shall consist of a random sample of up to 10% of each installation distribution system. The Contractor shall assume responsibility for providing the proper test equipment and staff to conduct tests. The District representative shall witness the tests.
 21. Should the initial 10% test not be 100% successful (all drops testing over CAT6 up to 250MHz), the Contractor shall assume responsibility to repair/replace non-passing links, at the direction of the District, and the links to re-verify and resubmitted. A 20%

- random sample shall then be conducted to ensure proper performance of the system.
22. Should there be failure in this re-test, the Contractor shall be responsible to repeat the re-test procedure until such time as all cabling is verified.

3.7 COMPLETION OF WORK

- A. At the completion of the Systems, the Contractor shall restore to its former condition, all aspects of the project site and on a daily basis, shall remove all waste and excess materials, rubbish debris, tools and equipment resulting from or used in the services provided under this Contract. All clean up, restoration, and removal noted above will be by the Contractor and at no cost to Owner. If the Contractor fails in its duties under this paragraph, Owner may upon notice to the Contractor perform the necessary clean up and deduct the costs thereof from any amounts due or to become due to the Contractor. It shall be the Contractor's responsibility to remove trash from the areas it is working in and bring trash and debris to the Contractor provided dumpster.

3.8 ADJUSTMENTS

- A. Occupancy Adjustments:
 1. When requested within 32 months of the date of substantial completion, provide up to four (4) on-site visits for each site for assistance in adjusting system to suit actual occupied conditions and to optimize performance of the installed equipment, reference 3.9.A Attachments "System Tuning & Adjustment." Tasks shall include, but are not limited to, the following:
 - a. Check cable connection
 - b. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed
 - c. Adjust all preset positions; consult District Technology representative.
 - d. Adjust camera views as needed: consult District Technology representative.

3.9 INSPECTION

- A. On-going inspections shall be performed during construction by the District's representative. All work shall be performed in a high quality manner and the overall appearance shall be clean, neat and orderly. Any work that does not meet the District's representative's approval shall be removed and reinstalled by the Contractor at no additional cost to the District.

3.10 LABELING REQUIREMENTS

- A. Numbers must be assigned to each outlet location using the designation convention as described in this document. Plan drawings with outlet locations and configuration information have been furnished to the Contractor. Contractor shall provide the equipment as necessary to generate Panduit PAN-CODE (or Equal) laser printer generated self-laminating labels using the numbering convention shown below and as specified herein. Before any permanent labels are installed on blocks, face plates or cables, Contractor shall submit a sample label of each various type listed below to Owner's Project Manager for written approval to ensure compliance with the labeling scheme, legibility, etc. Final label scheme shall be determined by the Owner's decision. Contractor is responsible to provide and install the labeling scheme as described below.
- B. All faceplates, cables, patch panel and wall field terminations shall be machine labeled and designated as specified in the following examples:
 1. Faceplate labeling format:
 - a. Building-Room-Port. The format is B-RRR-PPP.

- b. Wall outlet sample - D-102-006:
 - 1) D building number
 - 2) 102 room number
 - 3) 006 port number
- 2. IDF/LIU labeling MUST be inside a properly sized locking cabinet, which corresponds with each building number per plan drawings:
 - a. IDF cabinet sample - IDF 5 IDF:
 - 1) IDF cabinet.
 - 2) 5 building number.
- C. Backbone and Riser Cable Labeling. All backbone and riser cables (copper, fiber, coax, etc) will be labeled to reflect the origin and destination abbreviation for the cable and pair counts on large font (16 pitch) self-laminating labels, which shall be located within 18 inches of each end of the cable. Labels shall be placed on the cable to be visible without relocating surrounding cables:

Example #1:

IDF2/IDF3/CP100/01

IDF2 Cable

Origination IDF3

Cable

Destination

CP100 Cable Type & Pair or Strand Count (ex. 100-pair Copper Cable. Other possibilities include HB for hybrid fiber cable, MM f or multimode cable, and SM for singlemode cable.)

01 Cable identification number (ex. cable #01). There may be more than one backbone or riser cable with the same origin, destination and pair count.

- D. Patch Panel Labels, Horizontal. All patch panels shall have their ports numbered continuously and sequentially. For example, if there are two 48-port patch panels in an IDF cabinet, ports in the first patch panel shall be labeled 001 through 048. Ports in the second patch panel shall be labeled 049 through 096.
- E. Fiber Patch Panel Labels. All fiber patch panels will be labeled using self-laminating laser patch panel label markers. Fiber panel labels shall include all information as specified by the Owner. Contractor is responsible to provide a labeling scheme that meets with the Owner's satisfaction. At a minimum, the fiber panel label card shall indicate: destination of connected cables on the patch panel followed by a slash (/), origination of connected cables on the patch panel followed by a slash (/), and the port number adjacent to the port:

Example: MDF/IDF2/01

MDF Destination Patch Panel Location

Designation IDF2 Origination Patch Panel

Location Designation

01 Indicates port number on both origin and destination patch panels.

- F. Equipment Rack/Cabinet Labeling. All equipment racks/cabinets shall be labeled according to their room identifier and a two-digit number. The labels will be engraved plastic plates, with 1"-high white letters on black background. The labels will be attached to the cross member at the top front of each frame or rack with appropriately sized sheet metal screws. Self-adhesive strips, glues, etc. are unacceptable:

Example: MDF-01

MDF Room Designation

01 Rack Identifier

- G. Innerduct and Fiber Cable Warning Labeling. The Contractor shall provide and install tags of stamped plastic for tube cable and innerduct. The labeling convention described above within Paragraph E shall apply. Additionally, the Contractor will also install fiber optic warning tags (Panduit #PST-FO) every 12 feet on all exposed fiber optic cable and on innerduct containing fiber optic cable installed within the building, also on innerduct and cable visible in each pull box, manhole, and vault.
- H. MDF/BDF/IDF Floor Plan Mounting Frame: At the MDF location, provide a full sized floor plan labeled with all drop numbers and their corresponding locations in each room of every building included in the contract scope of work. Each building floor plan shall display each cable number serviced from the MDF and IDFs, the drop's physical location, and the proper device symbol shown on the symbol legend. Mounting frames shall be equipped with removable Plexiglas front covers. Frame and cover shall be sized to house full size floor plan drawing. Coordinate location of frame with Owner's Project Manager prior to installation.
- I. Telecommunications Main Grounding Busbars (TMGB, TGB): All telecom grounding busbars shall be labeled using large font (16 pitch) self-laminating labels. Labels shall indicate "TMGB" or "TGB". If more than 1 bus bar is in the room, include a numerical indication (ex: TMGB-1).

3.11 MISCELLANEOUS PROJECT REQUIREMENTS

- A. Site Cleaning: Throughout the progress of the plant construction, the Contractor shall keep the working area free from debris of all types and remove from the premises all rubbish resulting from any work done by Contractor. On a daily basis and at the completion of its work, the Contractor shall, to the extent possible, leave the premises in a clean and finished condition.
- B. Conduits: All backbone cabling will run through dedicated conduits. All new conduits will be supplied with a pull string. Contractor shall supply pull string and pull rope for the installation of all cables in existing conduits. For all conduits left with available capacity, Contractor shall replace pull strings with ¼-inch pull rope during the course of his work. Contractor must seal all conduits with an approved sealing compound.
- C. Cabling and Termination Identifications: All new cabling shall be of the type specified herein. Any conflicts between cabling types specified and code or design requirements shall be submitted to Owner's Project Manager for review and final disposition. All cabling shall be neatly laced, dressed and adequately supported. Cabling must be concealed to the fullest extent possible. In addition, a numbering and marking scheme must be used to identify all cable and cabling terminations. All cables, regardless of length, shall be marked and/or numbered at both ends. Marking codes and methodologies shall correspond to the instructions in this specification.
- D. Seismic Requirements: Contractor will install all equipment racks, equipment cabinet

enclosures, cable runways, etc. according to DSA and local, state and/or federal code. Contractor will notify Owner's Project Manager of such requirements and shall provide such bracing as required. Contractor to coordinate all installation with the structural Engineer of Record.

- E. Safety Requirements: Contractor will utilize appropriate personnel and display warning signs, signals, flags and/or barricades at the work site to ensure adherence to safety regulations and as prudence requires.
- F. Specification/Drawing Status: All specifications and drawings related to this project will be "frozen" after shop drawing approval. The Owner reserves the right to negotiate any future changes with the Contractor at any time.

3.12 MISCELLANEOUS SUPPORT REQUIREMENTS

- A. Upon approval of shop drawings, Contractor shall immediately place orders for all required materials, components, and supplies. In addition, Contractor shall secure and forward written confirmations (including orders and shipping dates) direct from each manufacturer/vendor to the Owner's Project Manager.
- B. Contractor shall expedite shipment of all materials, components and supplies, as necessary to ensure the successful completion of the Project by the date required. All costs for expediting shall be included within Contractor's pricing as provided below.
- C. The system cost herein shall include administration/maintenance training for at least ten Owner's representatives with a minimum allotment of three (3) eight hour sessions. All training shall include written and/or video materials that shall remain the property of Owner. If materials are written, they shall be provided in quantities sufficient for each person trained; if materials are video, one copy of each will be required. The administration/maintenance training shall include, but not be limited to, the following:
 - 1. Review of as-built documentation, including a site demonstration.
 - 2. All warranty information.
- D. Minimum standards for maintenance purposes shall include optional access to service on a 24 hour -a-day, 365 day -a-year basis. In addition, Contractor shall, upon notification, respond as follows:
 - 1. Emergency Response: Contractor must respond by utilizing remote diagnostics capabilities (as applicable) within thirty minutes of notification. If necessary, Contractor must dispatch at least one certified technician for arrival on-site within two hours of notification.
 - 2. Non-Emergency Response: Contractor shall respond by utilizing remote diagnostics capabilities and or cause dispatch of at least one certified technician for arrival on-site within one business day of notification.
 - 3. Definition of "Emergency": For maintenance purposes, "emergency" shall be defined as one or more of the following conditions:
 - a. Defects of any riser pairs and/or components involving at least ten percent (10%) of any riser cable's capacity.
 - b. Defects of station cable pairs and/or components involving at least ten percent (10%) of any department or group of voice and/or data stations.
 - c. Defects significantly impairing any single attendant console.
 - d. Defects of any fiber optic cable and/or components involving at least ten percent (10%) of any department's or group's fiber-based systems and/or stations.
 - e. Any pre-defined failure as submitted by Owner and agreed to be Contractor.

3.13 FINAL ACCEPTANCE

- A. The Owner or Owner's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.
- B. The Owner or Owner's representative will conduct a final job review once the Contractor has finished the job. This review will take place within one week after the Contractor notifies the Owner.
- C. Two copies of all certification data and drawings for all identifications shall be provided to the Owner before the Owner's review.
- D. The Owner or Owner's representative will review the installation and certification data prior to the system acceptance.
- E. The Owner or Owner's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the Owner reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the Contractor.
- F. In the event that repairs or adjustments are necessary, the Contractor shall make these repairs at his own expense. All repairs shall be completed within 10 days from the time they are discovered.
- G. The Contractor shall provide two (2) copies of an "operating and servicing manual" for the system within fourteen (14) calendar days of Owner's final acceptance of 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 (11"x17"); equipment specification cut sheets, complete performance test data, complete warrantee information and replacement parts list with current prices listed, contact information for repair and warranty work requests:
 - 1. The Contractor shall mount a full size 30" x 42" bond copy of each scaled Site Plan within MDF room and each IDF room with removable Plexiglas front cover. Frame and cover shall be sized to house the site plan and floor plan drawings. Coordinate location of frame with Owner's Project Manager prior to installation.
 - 2. The Contractor shall hand to the Owner a copy of any applicable installation specific software configurations including all log-in passwords in CD format.
 - 3. Warranty- The entire system shall be warranted free of mechanical or electrical defects for a period of three years after the final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no additional expense to the District.

END OF SECTION 27 00 00

SECTION 27 10 00 - STRUCTURED CABLING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Description:
1. The work included under this specification consists of furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this structured cabling system in compliance with the specifications and drawings. The Telecommunications contractor will provide and install all of the required material to form a complete system.
 2. The work shall include, but not be limited to the following:
 - a. Furnish and install a complete telecommunications wiring infrastructure as described on the plans and in these specifications.
 - b. Furnish, install, and terminate all UTP and Optical Fiber cable.
 - c. Furnish and install all wall plates, jacks, patch panels, and patchcords.
 - d. Furnish and install all required cabinets and/or racks as required and as indicated.
 - e. Furnish any other material required to form a complete system.
 - f. Perform link testing (100% of horizontal and/or backbone links) and certification of all components.
 - g. Furnish test results of all cabling to the owner on disk and paper format, listed by each closet, then by workstation ID.
 - h. Adhere and comply with all requirements of the product certification programs.
 - i. Provide owner training and documentation. (Testing documentation and As-built drawings).
- B. General:
1. This document describes the requirements for the contractors, products and installation relating to furnishing and installing Telecommunications systems.
 2. The Horizontal Cabling System as described in this document is comprised of cabling, infrastructure, J-hook pathways, and termination devices for Data systems.
 3. Contractor will provide a bid including all labor, materials, tools, and equipment required for the complete installation of work called for on the Construction Drawings and described in this Document. It is the responsibility of the Contractor to provide all material necessary to provide a complete and operable system. If the contractor feels that the system described is incomplete, they must address this in writing to the Owner/Owner's Representative before providing a bid.
 4. All questions concerning non-specified product and services will be address to the Owner's Representative before Contactor provides a bid. Owner expects that by accepting the Contractor's bid proposal that the Contractor has provided a competent bid for a complete solution.
 5. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of telecommunications outlets, typical installation details, cable routing and outlet types will be provided as an attachment to this document.
 6. Contact Manufactures Representative before submitting any bids. The Rep. for this area in Ryan DeSorbo rdesorbo@ewingfoley.com (408)833-3628.

- C. Regulatory References:
1. All work and materials shall conform in every detail to the rules and requirements of the National Fire Protection Association, the local Electrical Code and present manufacturing standards.
 2. All materials shall be UL Listed and shall be marked as such. If UL has no published standards for a particular item, then other national independent testing standards shall apply, and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled.
 3. All modular jacks, patch cords, consolidation point, and patch cords performance shall be verified (not just tested) by a third party to be category 6 component and channel compliant.
 4. The cabling system described in this is derived from the recommendations made in recognized telecommunications industry standards. The following documents are incorporated by reference:
 - a. ANSI/TIA/EIA – 568.0, Generic Telecommunications Cabling for Customer Premises.
 - b. ANSI/TIA/EIA – 568.2, Balanced Twisted Pair Cabling Components, Addendum 1.
 - c. ANSI/TIA/EIA – 606, Administration Standard for Telecommunications Infrastructure of Commercial Buildings, February 2002.
 - d. ANSI/ TIA/EIA – 758, Customer-Owned Outside Plant Telecommunications Cabling Standard.
 - e. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM).
 - f. National Fire Protection Agency (NFPA – 70), California Electrical Code (CEC).
 5. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.
 6. This document does not replace any code, either partially or wholly. The contractor must be aware of local codes that may impact this project.
- D. Drawings:
1. It shall be understood that the electrical details and drawings provided with the specification package are diagrammatic. They are included to show the intent of the specifications and to aid the telecommunications contractor in bidding the job. The telecommunications contractor shall make allowance in the bid proposal to cover whatever work is required to comply with the intent of the plans and specifications.
 2. The telecommunications contractor shall verify all dimensions at the site and be responsible for their accuracy.
 3. Prior to submitting the bid, the telecommunications contractor shall call the attention of the Engineer to any materials or apparatus the telecommunications contractor believes to be inadequate and to any necessary items of work omitted.

1.3 SUBMITTALS

- A. Under the provisions of this request for proposal, prior to the start of work the telecommunications contractor shall:
1. Submit proof from manufacturer of contractor's good standing in manufacturer's program.
 2. Submit appropriate cut sheets and samples for all products, hardware, and cabling.
- B. Work shall not proceed without the Owner's approval of the submitted items.
- C. The telecommunications contractor shall receive approval from the Owners on all substitutions of material. No substituted materials shall be installed except by written approval from the Owner.

1.4 QUALITY ASSURANCE

- A. The Telecommunications Contractor must be a Certified Installer for the products and/or system being supplied. A copy of certification documents must be submitted with the quote in order for such quote to be valid. The Telecommunications contractor is responsible for workmanship and installation practices in accordance with said certification.
- B. The telecommunications contractor shall staff the project with qualified personnel. All products shall be new and in good condition.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and receipt of products shall be at the site described in the Scope Section.
- B. Cable shall be stored according to manufacturer's recommendations as a minimum. In addition, cable must be stored in a location protected from vandalism and weather. If cable is stored outside, it must be covered with opaque plastic or canvas with provision for ventilation to prevent condensation and for protection from weather. If air temperature at cable storage location will be below 40 degrees F., the cable shall be moved to a heated (50 degrees F. minimum) location. If necessary, cable shall be stored off site at the contractor's expense.
- C. If the telecommunications contractor wishes to have a trailer on site for storage of materials, arrangements shall be made with the Owner.

PART 2 PRODUCTS

2.1 EQUIVALENT PRODUCTS

- A. All products described and part numbers given in this specification are those of Panduit, Superior Essex, Chatsworth, and Wire Basket Tray unless otherwise noted.
- B. Connectivity will conform with the District standard of Panduit.
 - 1. Items with allowable equals are noted as such.
- C. No pre-approved equals at this time.

2.2 WORK AREA SUBSYSTEM

- A. General:
 - 1. The work Area Subsystem shall consist of the connectivity equipment used to connect the horizontal cabling subsystem and the equipment in the work area. The connectivity equipment shall include the following options:
 - a. Patch Cords.
 - b. Modular Inserts and Jacks.
 - c. Faceplates.
 - d. Patch Cords.
- B. Patch Cords:
 - 1. Category 6 Data Outlet Patch Cords:
 - a. Specifications:
 - 1) Category 6/Class E, UTP, small diameter patch cords are constructed of 28 AWG, unshielded, twisted pair, stranded copper (dual-rated CM/LSZH) cable with high performance RJ45 modular plugs. Patch cords are offered in multiple lengths and colors for design flexibility
 - b. Technical Information:

- 1) Category 6/Class E channel and component performance: Exceeds all ANSI/TIA-568.2-D Category 6 and ISO 11801 Class E electrical performance requirements for frequencies up to 250 MHz Note: Panduit 28 AWG patch cords have attenuation de-rating value of 1.9. Supports 96-meter channels that include 90-meter permanent links. Supports 93-meter channels with 10 meters of patch cords included in the channel.
 - 2) Cable diameter: 0.150 in. (3.8mm) nominal.
 - 3) FCC and ANSI compliance: Meets ANSI/TIA-1096-A (formerly FCC Part 68).
 - 4) IEC compliance: Meets IEC 60603-7.
 - 5) PoE compliance: Supports IEEE 802.3af/802.3at (48 cables in a bundle) and 802.3bt type 3 and type 4 (24 cables in a bundle) PoE applications.
 - 6) Safety compliance: cULus Listed; UL 1863 and CAN/CSA-C22.2 (UL File E129886).
 - 7) RoHS compliance: Compliant.
 - 8) Operating temperature: 14°F to 167°F (-10°C to 75°C) Storage temperature: -40°F to 158°F (-40°C to 70°C.)
 - 9) Plug housing: UL94V-0 rated clear Polycarbonate.
 - 10) Contacts: Gold plated phosphor bronze; contacts plated with 50 microinches of gold for superior performance.
 - 11) Flammability rating: CM/LSZH dual-rated.
- c. Key Features and Benefits:
- 1) Smaller diameter, flexible cable design: Tight bend radius enables improved cable routing and management in high density applications. Smaller cable diameter allows twice the amount of cords to be routed through cable managers and pathways compared to traditional Category 6 patch cords. Reduced cable diameter facilitates improved air flow, cooling, resulting in lower operating costs than traditional Category 6 patch cords.
 - 2) Category 6 component compliance: Now Category 6 component compliant per the new ANSI/TIA-568.2-D standard.
 - 3) 100% performance tested for wire map, NEXT and return loss: Confidence that each patch cord delivers critical electrical component level performance. Centered de-embedded plug performs in center of ANSI/TIA-568.2-D Category 6 component range, ensuring interoperability and optimum performance.
 - 4) Integral pair manager: Optimizes performance and consistency by reducing untwist at plug.
 - 5) Patented tangle-free latch: Prevents snags and provides easy release, saving time on frequent moves, adds, and changes.
 - 6) Flexible stranded cable: U/UTP stranded 28 AWG copper cable with a nominal diameter of 0.150 in. (3.8mm) allows for high density installations and superior panel cable management.
 - 7) Identification label: Provides identification of performance level, length, and quality control number for traceability.
 - 8) Robust construction: Plug contact plated with 50 microinches of gold and rated to 2500 mating cycles.
 - 9) Variety of cable colors and lengths: Meets individual length and color-coding requirements for greater system flexibility.
 - 10) Available plug lock-in devices (optional): Plug lock-in and latch guard devices to prevent unauthorized or unintended removal of patch cords.
- d. Applications:
- 1) TX6-28 Category 6 Performance 28 AWG UTP Patch Cords support the following applications:
 - a) 1000BASE-T (Gigabit Ethernet), 100BASE-T (Fast Ethernet).
 - b) 155 Mb/s ATM, 622 Mb/s ATM, 1.2 Gb/s ATM.
 - c) Digital video and broadband/baseband analog video.
 - d) Voice/data systems.

- e. Voice over Internet Protocol (VoIP).
- f. All patch cords will be delivered to the site and must be signed for by the Owner/Owner's Representative. It will be the responsibility of the Owner to install all 'Work Area Data Patch Cords'.
- g. Data patch cords will be six (6) feet in length.
- h. Security Camera patch cords will be six (6) feet in length.
- i. **Colors:**
 - Data: BLUE
 - Security Camera: BLUE
- j. **Quantity:** Contractor will provide one (1) patch cord for every outlet cable shown on the drawings.
- k. **Part Number:** Panduit
 - Data: **UTP28SP6BU**
 - Security Cameras: **UTP28SP6BU**

WIRELESS DATA ONLY

- 2. Category 6A Data Outlet Patch Cords:
 - a. Specifications:
 - 1) Category 6A/Class EA, UTP, small diameter patch cords are constructed of 28 AWG, unshielded, twisted pair, solid copper (dual-rated CM/LSZH) cable with high performance RJ45 modular plugs. Patch cords are offered in multiple lengths and colors for design flexibility.
 - b. Technical Information
 - 1) Category 6A/ Class EA channel and component performance: Exceeds all ANSI/TIA-568.2-D Category 6A and ISO 11801 Class EA electrical performance requirements for frequencies up to 500 MHz.
 - a) Note: Panduit 28 AWG patch cords have attenuation de-rating value of 1.9. Supports 96-meter channels that include 90-meter permanent links. Supports 93-meter channels with 10 meters of patch cords included in the channel.
 - 2) Cable diameter: 0.185 in. (4.7mm) nominal.
 - 3) FCC and ANSI compliance: Meets ANSI/TIA-1096-A (formerly FCC Part 68) IEC compliance: Meets IEC 60603-7.
 - 4) PoE compliance: Supports IEEE 802.3af/802.3at (48 cables in a bundle) and 802.3bt type 3 and type 4 (24 cables in a bundle) PoE applications.
 - 5) Safety compliance: cULus Listed; UL 1863 and CAN/CSA-C22.2 (UL File E129886).
 - 6) RoHS compliance: Compliant.
 - 7) Operating temperature: 14°F to 167°F (-10°C to 75°C).
 - 8) Storage temperature: -40°F to 158°F (-40°C to 70°C).
 - 9) Plug housing: UL94V-0 rated clear Polycarbonate.
 - 10) Contacts: Gold plated phosphor bronze; contacts plated with 50 microinches of gold for superior performance.
 - 11) Flammability rating: CM/LSZH dual-rated.
 - c. Key Features and Benefits:
 - 1) Smaller diameter, flexible cable design: Tight bend radius enables improved cable routing and management in high density applications. Smaller cable diameter allows twice the amount of cords to be routed through cable managers and pathways compared to traditional Category 6A patch cords. Reduced cable diameter facilitates improved air flow, cooling, resulting in lower operating costs than traditional Category 6A patch cords.
 - 2) Category 6A component compliance: Now Category 6A component compliant per the new ANSI/TIA-568.2- D standard.
 - 3) 100% performance tested for wire map, NEXT and return loss: Confidence that each patch cord delivers critical electrical component level performance Centered de-embedded plug performs in center of ANSI/TIA-568.2-D

- Category 6A component range, ensuring interoperability and optimum performance.
- 4) Integral pair manager: Optimizes performance and consistency by reducing untwist at plug.
 - 5) Patented tangle-free latch: Prevents snags and provides easy release, saving time on frequent moves, adds, and changes.
 - 6) Identification label: Provides identification of performance level, length, and quality control number for traceability.
 - 7) Robust construction: Plug contact plated with 50 microinches of gold and rated to 2500 mating cycles.
 - 8) Variety of cable colors and lengths: Meets individual length and color-coding requirements for greater system flexibility.
 - 9) Available plug lock-in devices (optional): Plug lock-in and latch guard devices to prevent unauthorized or unintended removal of patch cords.
- d. Applications:
- 1) TX6A Category 6A Performance 28 AWG Patch Cords support the following applications:
 - a) 10GBASE-T Ethernet.
 - b) Data center I/O Consolidation.
 - c) Data center server virtualization.
 - d) Backbone aggregation.
 - e) Parallel processing and high-speed computing.
 - e. All patch cords will be delivered to the site and must be signed for by the Owner/Owner's Representative. It will be the responsibility of the Owner to install all 'Patch Cords'.
 - f. Wireless Access Point patch cords will be six (6) feet in length.
 - g. **Colors:**
WAP: BLUE
 - h. **Quantity:** Contractor will provide one (1) patch cord for every outlet cable shown on the drawings.
 - i. **Part Number:** Panduit
WAP: **UTP28X6BU**
- C. Modular Inserts and Jacks:
1. Category 6 Jacks:
 - a. Specifications:
 - 1) Category 6/Class E, 8-position, UTP jack module shall terminate 4-pair, 22 – 26 AWG, 100-ohm unshielded twisted pair cable and shall not require use of a punchdown tool. UTP jack modules shall use a forward motion termination method to optimize performance by maintaining cable pair geometry while eliminating conductor untwist. The termination cap shall be color-coded white to designate Category 6 performance and shall include a universal label coded for T568A and T568B wiring schemes.
 - b. Technical Information
 - 1) Category 6/Class E channel and component performance: Exceeds channel requirements of ANSI/TIA-568.2-D Category 6 and ISO 11801 Class E standards at swept frequencies 1 to 250 MHz Exceeds component requirements of ANSI/TIA-568.2-D Category 6 and ISO 11801 Class E standards at swept frequencies 1 to 250 MHz.
 - 2) FCC and ANSI compliance: Meets ANSI/TIA-1096-A contacts plated with 50 microinches of gold for superior performance.
 - 3) IEC compliance: Meets IEC 60603-7 and IEC 60512-99-001.
 - 4) RoHS compliance: Compliant.
 - 5) PoE & PoH compliance: Rated for 2500 cycles with IEEE 802.3af / 802.3at and 802.3bt type 3 and type 4. Supports Power over HDBaseT up to 100 watts.
 - 6) UL rated: UL 1863 (Use as communications circuit accessory) UL 2043

- (Suitable for use in air-handling spaces).
- 7) Operating Temperature: -10°C to 65°C (14°F to 149°F).
 - 8) Conductor termination range: Wire cap compatible with 22 – 26 AWG solid or stranded cable with conductor insulation diameters of 0.060 in. max. and overall cable O.D. 0.200 in. to 0.330 in.
- c. **Key Features and Benefits:**
- 1) 100% performance tested: Confidence that each jack module will deliver the critical electrical performance requirements.
 - 2) Utilizes enhanced Giga-TX Technology: Optimizes performance by eliminating conductor untwist and reduces installation time and expense.
 - 3) Modular: UTP jack modules snap in and out of all Mini-Com Faceplates, Modular Patch Panels and Surface Mount Boxes for easy moves, adds, and changes.
 - 4) Individually serialized: Marked with quality control number for future traceability.
 - 5) RJ45 interface: Industry standard interface provides a quick and easy plug and play connection to RJ45 patch cords; backwards compatible.
 - 6) Identification: Can be clearly identified with optional labels and icons for port identification.
 - 7) Angle termination version available: Side opening allows cable to be terminated to the right or left side of the jack module; ideal for installations that have minimal depth that may not allow standard bend radius practices to be accommodated.
 - 8) Termination tools (optional): EGJT-1 termination tool ensures conductors are fully terminated by utilizing a smooth forward motion without impact on critical internal components for maximum reliability; TGJT termination tool ideal for high volume installations.
 - 9) Block out device (optional): Provides a simple and secure method to control access to data ports while not in use.
 - 10) Shuttered version (optional): Integrated spring shuttered door keeps out dust and debris of unmated RJ45 jack modules automatically.
- d. **Application:**
- 1) Mini-Com TX6 PLUS UTP Jack Modules are a component of the TX6 PLUS UTP Copper Cabling System. This end-to-end system is interoperable and backwards compatible, providing design flexibility to protect network investments well into the future. With certified performance to the ANSI/TIA-568.2-D Category 6 and ISO 11801 Class E standards, this system is ideal for today's high performance workstation applications. With certified performance to the ANSI/TIA-568.2-D Category 6 and ISO 11801 Class E standards, these systems will support the following applications:
 - a) Ethernet 10BASE-T, 100BASE-T (Fast Ethernet), 1000BASE-T (Gigabit Ethernet).
 - b) 155 Mb/s ATM, 622 Mb/s ATM, 1.2 Gb/s ATM.
 - c) Token Ring 4/16.
 - d) Digital video and broadband/baseband analog video.
 - e) Voice over Internet Protocol (VoIP).
- e. **Color:**
- Data: BLUE
 - Security Camera: WHITE
- f. **Part Number:** Panduit
- BLUE: **CJ688TGBU**
 - WHITE: **CJ688TGWH**

WIRELESS DATA ONLY

2. Category 6A – WAP Jack:
 - a. Specifications:

- 1) Category 6A/Class EA, 8-position, UTP jack module shall terminate 4-pair, 22 – 26 AWG, 100-ohm unshielded twisted pair cable and shall not require use of a punchdown tool. The termination cap shall be color-coded blue to designate Category 6A performance and shall include a universal label coded for T568A and T568B wiring schemes. The Mini-Com TX6A 10Gig UTP Jack Module must be installed as part of the TX6A 10Gig UTP Copper Cabling System to achieve IEEE 10GBASE-T certified performance.
- b. Technical Information:
 - 1) Category 6A/Class EA channel and component performance: Certified channel performance in a 4-connector configuration up to 100 meters and exceeds the requirements of ANSI/TIA-568.2-D Category 6A and ISO 11801 Class EA standards swept up to 650 MHz for supporting 10GBASE-T transmission over twisted-pair cabling systems as part of the Panduit® TX6A 10Gig UTP Copper Cabling System Exceeds component requirements of ANSI/TIA-568.2-D Category 6A and ISO 11801 Class EA standards for supporting 10GBASE-T transmission over twisted-pair cabling systems.
 - 2) FCC and ANSI compliance: Meets ANSI/TIA-1096-A contacts plated with 50 microinches of gold for superior performance.
 - 3) IEC compliance: Meets IEC 60603-7 and IEC 60512-99-001.
 - 4) RoHS compliance: Compliant.
 - 5) PoE & PoH compliance: Rated for 2500 cycles with IEEE 802.3af / 802.3at and 802.3bt type 3 and type 4. Supports Power over HDBaseT up to 100 watts.
 - 6) UL rated: UL 1863 (Use as communications circuit accessory) UL 2043 (Suitable for use in air-handling spaces).
 - 7) Operating Temperature: -10°C to 65°C (14°F to 149°F).
 - 8) Conductor termination range: Wire cap compatible with 22 – 26 AWG solid or stranded cable with conductor insulation diameters of 0.060 in. max and overall cable O.D. 0.200 in. to 0.330 in.
- c. Key Features and Benefits:
 - 1) Interoperable: Compatible with components of the TX6A and TX6A-SD 10Gig UTP Copper Cabling System with MaTriX Technology (100-meter solutions) for increased design flexibility.
 - 2) Alien crosstalk suppression Innovative MaTriX split foil technology provides superior alien crosstalk performance enabling high density applications (48-ports, 1 RU).
 - 3) 100% performance tested: Confidence that each jack module will deliver the critical electrical performance requirements.
 - 4) Individually serialized: Marked with quality control number for future traceability.
 - 5) Shuttered version available: Integrated spring shuttered door keeps out dust and debris of unmated RJ45 jack modules automatically.
 - 6) Angle termination version available: Side opening allows cable to be terminated to the right or left side of the jack module; ideal for installations that have minimal depth to not violate cable bend radius.
 - 7) Termination tools (optional): EGJT-1 termination tool ensures conductors are fully terminated by utilizing a smooth forward motion without impact on critical internal components for maximum reliability; TGJT termination tool ideal for high volume installations.
 - 8) Block out device (optional): Provides a simple and secure method to control access to data ports while not in use.
- d. Applications:
 - 1) Mini-Com TX6A 10Gig UTP Jack Modules are a component of the TX6A 10Gig UTP Copper Cabling System with Vari-MaTriX Technology. This end-to-end system provides a cost-effective medium for ensuring that network bandwidth needs are easily met today and in the future. The Panduit solution helps ensure organizations efficiently and reliably meet their data transmission

needs. With certified performance to the ISO 11801 Class EA, IEEE 802.3an-2006 and ANSI/TIA-568.2-D Category 6A standards, this system will support high bandwidth applications like 10GBASE-T and HDBaseT and is ideal for running next generation Power over Ethernet (POE++)

e. **Quantity:** Contractor will provide one jack for every outlet cable shown on the drawings.

f. **Color:**
 WAP: YELLOW

g. **Part Number:** Panduit
 YELLOW: **CJ6X88TGYL**

3. Blank Insert:

a. **Color:** Coordinate with Electrical, based on faceplate color. Sample of approved insert shown below.

b. **Quantity:** Contractor will provide one insert for every blank outlet port in all faceplates.

c. **Part Number:** Panduit
 WHITE: **CMBWH-X**

D. Wall Mount and Modular Furniture Faceplates:

1. Standard Keystone Faceplate:

a. Specifications:

1) Faceplates shall be available in 1, 2, 4, and 6-port single gang and 10-port double gang with label and label cover for easy identification. Each faceplate shall accept Mini-Com Modules for UTP, STP, fiber optic, and audio/video that snap in and out. Executive Series faceplates shall have a raised profile for an aesthetic appearance.

b. Technical Information:

1) Mounting options: Screw holes with retention tabs, spaced for single and double gang openings; compatible with Panduit wall board adapters.
 2) Packaging: Supplied with two or four 1" long, #6 – 32 slotted head screws, labels and label covers; faceplates packaged one per bag, ten per box.

c. Key Features and Benefits:

1) Modular: Accepts all Mini-Com Modules which snap in and out for easy moves, adds, and changes.
 2) Identification: Includes built-in label pocket for easy identification.
 3) Various port densities: Provides design flexibility.
 4) Slotted screw holes: Allows faceplate to be adjusted to ensure proper alignment.

d. Applications:

1) Mini-Com Executive Series Faceplates are compatible with standard size single gang and double gang junction boxes. Faceplates can also be mounted to wallboard adapters and raceway mounting brackets. When using executive series faceplates with Panduit surface raceway, color matching is guaranteed. Labeling of executive series faceplates is easy with enclosed write-on labels, or with Panduit computer printable labels. If labels are not needed, matching screw covers can be used to conceal the screws and will mount flush with the faceplate for a clean look.

e. **Color:** Coordinate with electrical, based on faceplate color. Sample of approved faceplate shown below.

f. **Quantity:** Contractor will provide one single gang faceplate for each outlet shown on the drawings.

g. **Part Number:** Panduit

Part Number	Description
CFPE1IWHY	Single Gang, vertical faceplate holds up to one (1) QuickPort, snap-in modules - WHITE.

CFPE2IWHY	Single Gang, vertical faceplate holds up to two (2) QuickPort, snap-in modules - WHITE.
CFPE4IWHY	Single Gang, vertical faceplate holds up to four (4) QuickPort, snap-in modules - WHITE.
CFPE6IWHY	Single Gang, vertical faceplate holds up to six (6) QuickPort, snap-in modules - WHITE.

2. Blank Wall Plates:
 - a. Faceplates shall be constructed from either plastic or stainless steel, coordinate with electrical, based on electrical faceplate.
 - b. Faceplates shall be UL Listed and CSA Certified.
 - c. Faceplates shall be 2.75" W x 4.5" H for single gang.
 - d. **Color:** Faceplate color and material will be coordinated with electrical, based on adjacent outlet faceplate.
 - e. **Quantity:** Contractor will provide one (1) faceplate for each unused data/voice/video/intercom/security outlet shown on the drawings.
 - f. **Part Number: Panduit & Leviton**
 WHITE: **CPNWH** (Panduit)
 STAINLESS: **84014** (Leviton)
 WEATHER RESISTANT: **83014-EXT** (Leviton)

2.3 HORIZONTAL DISTRIBUTION CABLING

- A. General:
 1. The horizontal distribution cabling system is the portion of the telecommunications cabling system that extends from the Work Area (WA) telecommunications outlet/connector to the Horizontal Cross Connect (HC) in the telecommunications room (TR).
 2. The Horizontal Distribution Cabling consists of the following:
 - a. Copper Support System.
 - b. Copper Station Cable.
- B. Cabling Support System:
 1. J-Hooks:
 - a. Cable supports shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables: cULus Listed.
 - b. Cable supports shall have flared edges to prevent damage while installing cables.
 - c. Cable support system shall provide fasteners that allow them to be mounted to wall, concrete, joist, tee-bar wire, treaded rod, beams and raised floor supports.
 - d. Fasteners shall have the ability to either be factory or jobsite assembled; rated for indoor use in non-corrosive environments; cULus Listed.
 - e. Fastener to be installed with one continuous cable support, factory or jobsite assembled.
 - f. **Color:** N/A
 - g. **Quantity:** Contractor will provide quantities of j-hooks and hanger accessories in the amount necessary to support all horizontal cabling every 48 inches. See drawings for j-hook pathways.
 - h. **Part Number:** Equal to:

Panduit Part Number	Description
JP75W-L20	J Hook for wall mount applications. One 1/4" (M6) mounting hole for user supplied screw.
JP75WP2B-L20	J Hook for powder actuated installation on walls. One 5/32" (M4) mounting hole for user supplied fasteners.
JP131W-L20	J Hook for wall mount applications.

JP131WP2B-L20	One 1/4" (M6) mounting hole for user supplied screw. J Hook for powder actuated installation on walls. One 5/32" (M4) mounting hole for user supplied fasteners.
JP2W-L20 JP2WP2B-L20	J Hook for wall mount applications. One 1/4" (M6) mounting hole for user supplied screw. J Hook for powder actuated installation on walls. One 5/32" (M4) mounting hole for user supplied fasteners.
JP4W-X20 JP4WP2B-X20	J Hook for wall mount applications. One 1/4" (M6) mounting hole for user supplied screw. J Hook for powder actuated installation on walls. One 5/32" (M4) mounting hole for user supplied fasteners.

**Suitable for use in air handling spaces in accordance with Sec. 300.22(c) and (d) of the California Electrical Code when mounted as single units or in pairs. JP4 family of parts suitable for use in single unit configurations only. Listed in accordance with CAN/ULC S102.2 when mounted as single units or in pairs. Maximum spacing of 4' (1220mm) required between mount points. (Flame Spread Rating = 0, Smoke Developed Classification = 20) ^ Available in red. Replace -L20 with -L2 or -X20 with -X2 in part number suffix. ‡ Available in blue. Replace -L20 with -L6 or -X20 with -X6 in part number suffix

C. Copper Station Cable:

1. Category 6 Copper Unshielded Twisted Pair (UTP) Cable:

a. Features and Benefits:

- 1) Unique separator design engineered for consistent electrical performance.
- 2) Performance guaranteed to 350 MHz.
- 3) TRU-Mark print legend contains footage markings from 1000' to 0'.
- 4) Third-party verified for guaranteed performance.
- 5) Made in U.S.A.

b. Applications:

- 1) IEEE 802.3: 1000 BASE-T, 100 BASE-TX, 10 BASE-T, PoE, PoE+.
- 2) ANSI/TIA 854: 1000 BASE-TX.
- 3) CDDI, Token Ring, ATM.
- 4) Digital Video.
- 5) Broadband and Baseband Analog Video.

c. Standard Compliances:

- 1) ANSI/TIA 568-C.2.
- 2) NEC/CEC Type CMR (UL 1666) for Non-Plenum.
- 3) NEC/CEC Type CMP (NFPA 262) for Plenum.
- 4) UL 444.
- 5) RoHS Compliant Directive 2011/65/EU.
- 6) ANSI/TIA 862 (Building Automation).
- 7) ICEA S-116-732.
- 8) ICEA S-102-700.
- 9) ISO/IEC 11801 Ed. 2.0 (Class E).

d. Construction:

- 1) Conductor:
 - a) 23 AWG Solid bare annealed Copper.
- 2) Insulation:
 - a) Non-Plenum: Polyolefin.
 - b) Plenum: Fluoropolymer.

- 3) Pairing:
 - a) 4 Pairs or 2x4 pairs with varying lay length.
- 4) Outer sheath:
 - a) Non-Plenum: Flame-Retardant PVC.
 - b) Plenum: Low-Smoke, Flame-Retardant PVC.
- e. Physical Data:
 - 1) Nominal Cable Diameter (in):
 - a) CMR (Non-Plenum) 0.220.
 - b) CMP (Plenum) 0.205.
 - 2) Nominal Cable Weight (lbs./1000ft):
 - a) CMR (Non-Plenum) 24.
 - b) CMP (Plenum) 25.
 - 3) Minimum Bend Radius (in):
 - a) CMR (Non-Plenum) 1.0.
 - b) CMP (Plenum) 1.0.
 - 4) Maximum Pulling Force (lbs.):
 - a) CMR (Non-Plenum) 32.
 - b) CMP (Plenum) 32.
 - 5) Temperature Rating (°C):
 - a) Installation: 0 to +60.
 - b) Operation: -20 to +75.
- f. Electrical Characteristics:
 - 1) DC Resistance: 0hm/100m (328ft) at 20°C – Max. 9.38 / Nom. 7.50.
 - 2) Resistance unbalance: Individual pair % - Max. 4.00 / Nom. <1.
 - 3) Delay skew: ns/100m – Max. 40 / Nom. CMP:30 & CMR:35.
 - 4) Nominal velocity of propagation NVP: % of speed of light – CMP:70 & CMR:68.
 - 5) Characteristic impedance Frequency (f): 1-350MHz Ohms 100+/-15.
- g. Jacket Color:
 - 1) All Cat 6: Blue.
- h. **Quantity:** See Drawings for Quantity and installation details.
- i. **Part Number:** Shall be equal to **General Cable:**
 - 1) For Riser Application: **7133800.**
 - 2) For Plenum Applications: **7131800.**
 - 3) For Indoor/Outdoor Application: **7141007.**
 - 4) For Outdoor Application: **7136100.**
2. Category 6A Copper Unshielded Twisted Pair (UTP) Cable:
 - a. Features and Benefits:
 - 1) Innovative design provides guaranteed performance using the industry's smallest 6A cable.
 - 2) Smaller cable diameter allows for greater cable density, reducing cable management costs.
 - 3) Simplified design and improved bend radius make it easier to strip, terminate and route, reducing installation time and expense.
 - 4) CMP 90°C jacket rating provides consistent performance in a wide range of operating environments.
 - 5) UL Listed CMP-LP 0.6A with certified performance for high power PoE applications.
 - 6) UL Listed CMR-LP 0.5A with certified performance for high power PoE applications.
 - 7) CMP - UL verified with certified performance for 100W power over HDBaseT.
 - 8) Innovative cross-web separator with patented design provides superior internal electrical characteristics by locking the pairs into a systematic orientation within the cable.
 - 9) Streamlined design allows for 36 reels per pallet, improving distribution and warehousing efficiency.
 - 10) TRU-MARK print legend contains footage markings from 1000' to 0'.

- 11) All GenSPEED products are Made in the U.S.A.
- b. Applications:
 - 1) IEEE 802.3: 1000 BASE-T, 1000 BASE-TX, 1000 BASE-T, PoE, PoE+ and POE++.
 - 2) ANSI/TIA 854: 1000 BASE-TX.
 - 3) CDDI, Token Ring, ATM.
 - 4) Digital Video.
 - 5) Broadband and Baseband Analog Video.
- c. Standard Compliances:
 - 1) ANSI/TIA 568.2-D • .
 - 2) NEC/CEC Type CMP (NFPA 262) for Plenum.
 - 3) NEC/CEC Type CMR (UL 1666) for Riser.
 - 4) UL Listed CMP-LP 0.6A.
 - 5) UL Listed CMR-LP 0.5A.
 - 6) UL 444.
 - 7) UL 4299.
 - 8) RoHS Compliant Directive 2011/65/EU.
 - 9) ANSI/TIA 862 (Building Automation).
 - 10) ICEA S-116-732.
 - 11) ISO/IEC 11801 Ed. 2.0 (Class EA).
- d. Construction:
 - 1) Conductor:
 - a) 23 AWG Solid bare annealed Copper.
 - 2) Insulation:
 - a) Non-Plenum: Thermoplastic.
 - b) Plenum: Fluoropolymer.
 - 3) Pairing:
 - a) 4 Pairs or 2x4 pairs with varying lay length.
 - 4) Outer sheath:
 - a) Non-Plenum: Flame-Retardant PVC.
 - b) Plenum: Low-Smoke, Flame-Retardant PVC.
- e. Physical Data:
 - 1) Nominal Cable Diameter (in):
 - a) CMR (Non-Plenum) 0.260.
 - b) CMP (Plenum) 0.250.
 - 2) Nominal Cable Weight (lbs./1000ft):
 - a) CMR (Non-Plenum) 32.
 - b) CMP (Plenum) 32.
 - 3) Minimum Bend Radius (in):
 - a) CMR (Non-Plenum) 1.06.
 - b) CMP (Plenum) 1.0.
 - 4) Maximum Pulling Force (lbs.):
 - a) CMR (Non-Plenum) 40.
 - b) CMP (Plenum) 40.
 - 5) Temperature Rating (°C):
 - a) Installation: 0 to +60.
 - b) Operation: -20 to.
- f. Electrical Characteristics:
 - 1) DC Resistance: Ohm/100m (328ft) at 20°C – Max. 9.38 / Nom. 7.50.
 - 2) Resistance unbalance: Individual pair % - Max. 4.00 / Nom. <1.
 - 3) Delay skew: ns/100m – 45ns/100m.
 - 4) Nominal velocity of propagation NVP: % of speed of light – 70.
 - 5) Characteristic impedance Frequency (f): 1-500MHz Ohms 100+/-15.
- g. **Jacket Color:** All Cat 6A: Blue.
- h. **Quantity:** See Drawings for Quantity and installation details.
- i. **Part Number:** Shall be equal to General Cable:

- 1) For Riser Application: **7143819**.
- 2) For Plenum Applications: **7151819**.
- 3) For Indoor/Outdoor Application: **7141007**.
- 4) For Outdoor Application: **8136100**.

2.4 BACKBONE CABLING

- A. General:
1. The backbone cabling system is the portion of the telecommunications cabling system that extends from the Main Cross Connect (MC) to each Horizontal Cross Connect (HC).
 2. The Backbone Cabling system includes:
 - a. Fiber Optic Backbone Cabling.
 - b. Copper Backbone Cabling.
- B. Fiber Optic Backbone Cabling:
1. Data System Backbone Cabling:
 - a. Fiber:
 - 1) 2–144 fibers.
 - 2) 900 µm tight buffer.
 - 3) Color-coding per TIA/IEIA 598 B.
 - b. Central Strength Member:
 - 1) Epoxy/glass rod (above 12 fibers).
 - c. Overall, Strength Member:
 - 1) Aramid fiber yarn.
 - d. Jacket:
 - 1) UV-resistant black jacket.
 - 2) Flame-retardant compound.
 - 3) Sequential footage markings*.
 - e. Features:
 - 1) Dry Water Block cable core for fiber protection.
 - 2) Direct termination of connectors on tight buffer.
 - 3) Sub-units are numbered for identification.
 - f. Performance:
 - 1) Temperature:
 - a) Storage -40°C (-40°F) to +70°C (+158°F).
 - b) Installation 0°C (+32°F) to +50°C (+122°F).
 - c) Operating -20°C (-4°F) to +70°C (+158°F).
 - 2) Minimum Bend Radius:
 - a) 20 X OD—Installation.
 - b) 10 X OD—In-Service.
 - 3) Maximum Crush Resistance:
 - a) 850 lbs./in (1485 N/cm).
 - 4) Maximum Vertical Rise—1,640 ft (500 m).
 - g. Applications:
 - 1) Intrabuilding and interbuilding voice or data communication backbones.
 - 2) Outdoor use in ducts and underground conduits.
 - 3) ETL Listed Type OFNP for installation in vertical riser and general horizontal applications when installed in accordance with CEC Article 770.154 and 770.179.
 - h. Compliances:
 - 1) ETL Listed Type OFNP.
 - 2) CSA FT6.
 - 3) TIA 568 C.3.
 - 4) ICEA S-104-696.
 - 5) GR-409.

- 6) RoHS Compliant Directive 2011/65/EU.
 - i. The fiber optic cable in this specification is manufactured by **General Cable**.
 - j. **Color:** Fiber optic cable jacket shall be **BLACK**.
 - k. **Quantity:** See Drawings for quantity and installation details.
 - l. **Part Number:** Shall be equal to **General Cable**:
 - 1) 12 Strand Single Mode Fiber (Tight-Buffer - Indoor/Outdoor) **AP0121ANU.BK**.

2.5 TELECOMMUNICATIONS ROOM

- A. General:
 1. The Telecommunications Room (TR) includes those products that terminate horizontal and backbone cabling sub-systems and connect them to the network equipment.
 2. The Telecommunications Room equipment includes:
 - a. Copper Patch cords.
 - b. Fiber Optic Patch Cords.
 - c. Horizontal Cabling Termination Equipment.
 - d. Backbone Cabling Termination Equipment.
 - e. Cabinets, Racks, and Enclosures.
 - f. Cable Support System.
 - g. Ground and Bonding Equipment.
- B. Copper Patch Cords:
 1. Category 6A Patch Cords:
 - a. TR copper patch cords shall comply with those specified in 2.1 Work Area Sub-System, A. Patch Cords, 2 Category 6A Wireless Access Point Outlet Patch Cords.
 - 1) All patch cords will be delivered to the site and must be signed for by the Owner/Owner's Representative. It will be the responsibility of the **27 2000A – Network Electronics – Wireless Access** contractor to install all TR Data patch cords.
 - b. **Color:**
Data: BLUE.
Security Camera: WHITE.
WAP: YELLOW.
 - c. **Quantity:** Contractor will provide one (1) patch cord for every outlet shown on the drawings.
 - d. All patch cords will be eight (8) inches in length.
 - e. **Part Number:** Panduit
BLUE: **UTP28X8INBU**.
WHITE: **UTP28X8IN**.
YELLOW: **UTP28X8INYL**.
- C. Fiber Patch Cords:
 1. Single Mode Fiber Patch Cords:
 - a. Technical Information:
 - 1) Push-Pull LC Duplex Fiber Optic Patch Cords containing the custom push-pull strain relief boot and duplex clip, allow users easy accessibility when deploying very high-density LC patch fields in data center applications. Available in riser (OFNR), and low smoke zero halogen (LSZH) rated jacket materials to comply with local cabling ordinances and OM4, OM3 or OS1/OS2 fiber types to meet the demands of today's highest speed applications.
 - b. Application:
 - 1) Provide interconnect and cross-connect of applications in entrance facilities, telecommunication rooms, data centers, at the desk and network applications to interconnect pre-terminated cassettes in main distribution, horizontal distribution, and equipment distribution areas.
 - c. Construction:

- 1) Fiber count: Duplex (2-fiber) jacketed zipcord.
 - 2) Cable jacket ratings: Riser (OFNR) Low Smoke Zero Halogen (LSZH) per: IEC 60332-1-2, IEC 60332-3-24, IEC 60754-1, IEC 60754-2, IEC 61034-2.
 - 3) Fiber types: Single mode: OS1/OS2 9/125µm Multimode: OM3 50/125µm OM4 50/125µm.
 - 4) Connector types, End 'A': Duplex LC.
 - 5) Connector types, End 'B': Duplex LC.
 - 6) Jacket color: OS1/OS2: Yellow OM3: Aqua OM4: Aqua.
 - d. Optical Properties:
 - 1) Connector insertion loss: Standard: 0.25dB max (OM3 and OM4) 0.35dB max (OS2) Optimized: 0.15dB max (OM3 and OM4) Ultra: 0.10dB max (OM4).
 - 2) Connectors return loss: 26dB min (OM3 and OM4) 55dB min (OS1/OS2).
 - e. Physical Properties:
 - 1) Cable outside diameter (OD): 1.6mm duplex.
 - 2) Bend Radius (min) Short-Term: 16mm.
 - 3) Bend Radius (min) Long-Term: 32mm.
 - 4) Connector cable retention: 50N (4.24lb) @ 0° 19.4N (4.4lb)@ 90°.
 - 5) Connector durability: 500 cycles.
 - f. Environmental Properties:
 - 1) Storage and shipping temperature: -40°C to 70°C.
 - 2) Operating and installation temperature: -10°C to 60°C.
 - g. Standards:
 - 1) Meets or exceeds ISO/IEC 11801, TIA-568-C.3, TIA-604-10 (FOCIS-10).
 - 2) Restriction of Hazardous Substances (RoHS) Compliance: All patch cord components meet the requirement of Directive 2002/95/EC.
 - h. All optical, mechanical, and environmental performance shall meet and/or exceed the ANSI/TIA 568-C.3 specifications.
 - i. MDF Fiber patch cords will be two (2) meter long.
 - j. IDF Fiber patch cords will be one (1) meter long.
 - k. **Color:** N/A
 - l. **Quantity:** Contractor will provide two (2) fiber patch cords for every twelve (12) strands of fiber optic backbone cable run.
 - m. **Part Number:** Panduit:
 - a) MDF Single-Mode: **F92ERLNLNSNM002**
 - b) IDF Single-Mode: **F92ERLNLNSNM001**
- D. Horizontal Cable Termination Equipment:
1. Copper Termination Equipment – Category 6 and 6A Patch Panels:
 - a. Specifications:
 - 1) High density modular patch panels shall consist of a metal panel with molded front or rear snap-in faceplates. Patch panels shall accept all Mini-Com Modules for UTP, STP, A/V or select fiber and shall mount to standard 19" racks. Patch Panels shall be available in 32-port (1 RU), 48-port (1 RU) and 72-port (2 RU). Select styles shall be available in white. Flush mount panels shall be easy to identify with pre-numbered ports. Angled patch panels shall be designed at an optimum angle to help route the cable.
 - b. Technical Information:
 - 1) Mounting options: Mounts to standard 19" rack.
 - 2) Material: Stamping is CRS and faceplate is ABS.
 - 3) Packaging: Packaged with appropriate pre-installed snap in faceplates and a set of mounting screws (#12-24).
 - c. Key Features and Benefits:
 - 1) Modular: Panels with front snap-in faceplates will accept any Mini-Com Modules and panels with rear snap-in faceplates will accept all UTP, STP, A/V and most fiber modules.
 - 2) Angled design: Minimizes the need for horizontal cable managers enabling

- patch cords to be routed directly into vertical cable managers which leads to increase closet density.
- 3) Port and panel identification: Pre-numbered ports and labeling capabilities on select panels
 - 4) Optional strain relief bars to help support and manage cables.
 - 4) Optional filler panels: Flat and angled design fill unused rack openings to provide a clean and consistent look when used with any version of Panduit patch panels.
 - 5) Optional extender bracket: Allows 19" patch panels to be mounted on a 23" rack.
 - 6) High density: More modules per rack space.
 - 7) Color options: Select styles available in white, standard color is black.
- d. Applications:
- 1) Mini-Com High Density Patch Panels are ideal for multi-media applications. Flat and angled designs are available in various port densities to fit most needs. Flush mount style includes pre-numbered ports or area for adhesive labeling, select faceplate style panels with label pockets include pre-numbered labels and covers. Angled patch panels are available for applications in which rack space is limited. The design allows cable to flow to each side of the rack, minimizing the need for horizontal cable managers and increasing the density of the rack space. High density patch panels can mount on a standard 19" rack or a 23" rack when using the extender brackets PEB1 or PEB2.
- e. **Color:** Patch panel shall be **BLACK**.
- f. **Quantity:** The number of patch panels to be supplied shall be derived by multiplying the number of category 6/6A cables being terminated at the individual TR by 1.25 and providing additional panel in the nearest 24 port increment.
- g. **Part Number:** Panduit
24 & 48 Port: **CPP48HDEWBL**
Patch Panels will utilize the jacks noted in Section 2-2.1-C of this specification.
- E. Backbone Cable Termination Equipment:
1. Fiber Termination Panels:
 - a. Specifications:
 - 1) The fiber cassette enclosure shall house, organize, manage and protect fiber optic cable, terminations, splices, connectors and patch cords. Enclosure shall accommodate all Panduit pre-terminated MTP* cassettes, fiber adapter panels (FAP) and fiber mount panels (FMP), and associated trunk cables, connectors and patch cords, and shall include integral cable management and bend radius control for transition to vertical cable managers. Fiber optic enclosure shall be constructed of steel material. Molded front and rear doors shall be removable for cabling and connector access and installation. A flat front door shall enable access to fiber without moving the drawer. Enclosure shall provide full front access with a drawer that slides out and tilts down regardless of how many enclosures are stacked together. 1 RU enclosure shall be available in an open-access version which allows patch cord access from both top and bottom of the enclosure housing. Enclosure shall have multiple knockouts for a variety of trunk cable entry points.
 - b. Technical Information:
 - 1) Dimensions:
 - a) FCE1U, FCE1UA: 1.72"H x 17.6"W x 16.8"D (43.8mm x 447mm x 426.5mm), 1 RU.
 - b) FCE2U: 3.47"H x 17.6"W x 16.8"D (88.2mm x 447mm x 426.5mm), 2 RU.
 - c) FCE4U: 6.8"H x 17.6"W x 16.8"D (172.7mm x 447mm x 426.4mm), 4 RU.
 - 2) Mounting: Integral mounting flange for installation in 19" wide EIA-310 racks.
 - 3) Accessories: Mounting hardware and accessory kit with labels included.
 - c. Key Features and Benefits:

- 1) Modular design mounts up to 4 Opticom QuickNet Cassettes or FAPs per RU: Provides higher patch field density in fewer rack units saving valuable space.
 - 2) Works with all Panduit Opticom QuickNet Fiber Optic Cassettes and Fiber Adapter Panels: Provides versatility and flexibility with a fully modular solution for a variety of pre-terminated installations, FAP and field termination, and splicing installations. Works with all Panduit LC, SC, ST, MT-RJ and MTP* fiber adapter panels and cassettes.
 - 3) Hinged, swing down front door: Enables access to fiber optic patch cords without needing to move drawer for easier moves, adds, and changes; enables stacking for reduced real estate.
 - 4) Slide-out, tilt-down drawer: Offers total front access to all patch cords and rear cables for in-cabinet and top-of-rack mounting locations.
 - 5) Integral cable management: Ensures proper cable routing, bend radius control, and rear slack storage for all patch cords, interconnect cables, and trunk cables.
 - 6) New fiber optic splice module: Can fusion splice up to 96 fibers per RU in a single enclosure with one-to-one splice-to-patching ratio.
 - 7) TIA-606-A compatible labeling: Standards-based, mechanically printed labeling of fiber connectivity, patchfields, and enclosures enables clear and accurate labeling for easy moves, adds and changes.
- d. Applications:
- 1) Opticom QuickNet Rack Mount Fiber Cassette Enclosures provide a system for managing fiber terminations, connections, and patching in all types of applications. The enclosures are a component of the Opticom QuickNet Fiber Cabling System. They are ideal for fast, reliable patch field creation in cross-connect or inter-connect main distribution areas (MDA) or horizontal distribution areas (HDA) for storage area network (SAN) patching. The enclosure can also serve as a transition point for pre-terminated MTP* interconnect or trunk cables patched to active equipment in data center server cabinets or LAN switch racks. The enclosures provide high patch field densities with the FCE1U housing up to 96 fibers in 1 RU, the FCE2U housing up to 192 fibers in 2 RU, and the FCE4U housing up to 288 fibers in 4 RU. Integral cable management, bend radius control, and slack management features protect fiber optic cables, patch cords, and connectors to ensure end-to-end signal integrity.
- e. **Color:** Fiber Panel will be BLACK.
- f. **Quantity:** See Drawing for quantity and installation details.
- g. **Part Number:** Panduit
- | | | |
|-----|---------------------|--------------|
| 1RU | Up to 96 LC Fibers | FCE1U |
| 2RU | Up to 192 LC Fibers | FCE2U |
| 4RU | Up to 288 LC Fibers | FCE4U |
- h. Provide **FAPB** for each enclosure required, quantity will be determined by the amount of fiber optics in each location. Provide as required.
2. Fiber Terminations:
- a. Fiber Optic Cassette:
 - 1) Fiber Type: OS2.
 - 2) Sub Brand: HD Flex.
 - 3) Number of Fibers: 12 Fiber.
 - 4) Connector 1 Type: LC Duplex.
 - 5) Material: Zirconia Ceramic.
 - 6) Adapter Color: Blue.
 - 7) Maximum Connector Insertion Loss (db): 0.35.
 - 8) Minimum Connector Return Loss (dB): 55.
 - 9) Overall Width (In.): 7.5 (mm): 190.4.
 - 10) Overall Depth (In.): 7.3 (mm): 184.
 - 11) Overall Height (In.): 0.46 (mm): 11.7.

- 12) Standards meets or exceeds: ISO/IEC 11801, ANSI/TIA-568-C.3, TIA-604-5 (FOCIS), TIA-604-10 (FOCIS-10), RoHS Compliant.
- 13) Product Type: Splice Cassette.
- 14) Application: Data Center Cabling, Cable Management.
- 15) Color: Blue.
- 16) Fiber Diameter (µm): 9.
- b. **Color:** NA
- c. **Quantity:** See Drawing for quantity and installation details.
- d. **Part Number:** Panduit
 - 1) FHS9N-12-10P (OS2).

F. Cabinets, Racks, and Enclosures:

1. General:
 - a. Contractor will provide the following 'MDF/IDF' enclosures and components based on the number of cables that will be terminated.
2. 2-Post Equipment Rack (MC/MDF Locations):
 - a. Specifications:
 - 1) The data equipment rack shall meet EIA-310D standards and be constructed of extruded aluminum or steel capable of accepting 19" wide EIA equipment. The telecommunications rack shall be constructed of extruded aluminum and capable of accepting 23" wide telecommunications equipment. Rack construction method shall ensure an electrically bonded structure for ease of grounding. The 3" channel rack shall be UL listed for 1000 lbs. load rating and the 6" channel rack shall be UL listed for 1500 lbs. load rating. The equipment mounting rails shall be double-sided #12-24 EIA universal mounting hole spacing. The equipment mounting rails shall include printed rack space identification on the front and back and be numbered up. The channel of the rack shall be capable of mounting NetRunner or PatchRunner Vertical Cable Managers. 24 #12-24 mounting screws shall be included with the rack.

b. Technical Information:

- 1) Dimension:

	<u>Part Number</u>	<u>RU</u>	<u>Height in. (mm)</u>	<u>Width in. (mm)</u>	<u>Depth in. (mm)</u>
a)	R2P96	52	96.1 (2441)	20.3 (514)	3.0 (76)
b)	R2P(WH)	45	84.0 (2134)	20.3 (514)	3.0 (76)
c)	R2P79	42	79.0 (2007)	20.3 (514)	3.0 (76)
d)	R2P48	24	48.0 (1219)	20.3 (514)	3.0 (76)
e)	R2PS	45	84.0 (2134)	20.3 (514)	3.0 (76)
f)	R2P6S	45	84.0 (2134)	20.3 (514)	6.0 (152)
g)	R2P6S96	52	96.1 (2441)	20.3 (514)	6.0 (152)
h)	R2PW	45	84.0 (2134)	24.5 (616)	3.0 (76)

- 2) Packaging: Includes right and left mounting rack channels, top and bottom brackets, assembly hardware with paint piercing washers and anti-oxidizing paste for complete rack bonding.

c. Key Features and Benefits:

- 1) Rack spaces: The 8' rack with 52 rack spaces allows more equipment in the same footprint to maximize real estate for lowest cost of ownership.
- 2) Extruded aluminum construction: Designed to be lightweight and durable for easier deployment and reduced transportation costs; UL listed for 1000 lbs.
- 3) Heavy duty steel construction: 6" channel rack designed for higher weight capacity for large equipment; UL listed for 1500 lbs.
- 4) Printed rack space identification: Allows for quick location of rack mounted equipment for faster installation and less rework; see individual customer drawings for specific rack RU numbering.
- 5) Paint piercing washers: Fully electrically bonds rack components to simplify grounding process for improved network reliability.

- 6) Double-sided #12-24 mounting holes: Provides ability to mount equipment on both sides of the rack channel for improved system flexibility.
 - 7) Multiple mounting hole locations: Provides flexibility to mount to floor using any of three-hole locations. Note: Utilizing holes closest to the vertical uprights will minimize deflection.
 - 8) J-bolt accessibility: J-bolt can be attached to top bracket without violating top RU space.
- d. Applications:
- 1) Panduit 2 post standard equipment rack provides a reliable foundation for mounting telecommunication and data center equipment. The rack can be used to manage high performance copper and fiber patch cables. This modular rack system is compatible with Panduit horizontal and vertical cable managers. The 2-post standard equipment rack is part of a complete rack and cable management system that manages, protects, and showcases your network investment.
- e. Color: Black.
- f. **Quantity:** As shown on diagrams.
- g. Part Number: Panduit
2-Post Rack: **R2P**
- h. **Part Number: Panduit & Tripp Lite** (Each 2-post rack will consist of the items noted below at minimum).
- | | |
|------------------------------------|---------------------------------|
| 1) Qty:(2) Vertical Cable Managers | PR2VD06 (Panduit) |
| 2) Qty:(2) Fixed Shelves | SRM19CM3 (Panduit) |
| 3) Qty:(1) Rack-Mount Console | B021-000-19 (Tripp Lite) |
| 4) Qty:(1) Rack-Mount Bracket | B019-000 (Tripp Lite) |
3. Wall Mount Cabinets (HC/IDF Locations):
- a. Description: Wall-mount cabinets manufactured from steel sheet. Non-seismic applications - Maximum equipment weight of 200lb (91kg) for 24”H and 250lb (113kg) for 36”H when secured to the structural wall with standard anchors. Non-seismic load is tested per UL 2416 and the cabinet is UL Listed NWIN.E227626.
- 1) Color: Black textured powder coated steel.
 - 2) Size: 24 Inches, 12RMU:
 - a) UL Listed: 200lb (91kg) Capacity.
 - 3) Size: 36 inches, 19RMU:
 - a) UL Listed: 250lb (113kg) Capacity.
 - 4) Construction Material: Body 14GA CRS, Doors 16GA CRS, Rails 12GA CRS
 - 5) Front Door: Mesh.
 - 6) Access Control: Lockable Swing Handle.
 - 7) Rear Sections: 5.28 inches (133 mm) deep independent locking rear section with 16 inches C-to-C holes for mounting to the wall. 1", 2", 3" nominal concentric conduit knockouts are available on topsides. Integral support shelf providing base for center section to be supported.
 - 8) Center Section: 23.81 inches (610mm) wide by 24.29 inches (617mm) deep center swing-out section provides front & rear access to cables. Heavy duty hinges come preinstalled. Draw latches are included for additional support and ease of lock operation when under the load. Integral roller to provide smooth travel across rear section support shelf.
 - 9) Equipment Mounting Rails: Two pair of 3/8” square (M6); spaced horizontally to support 19 inches (482.6 mm) wide EIA-310-E compliant rack-mount equipment and shall provide 12RMU of rack-mount space.
 - 10) Mounting: Center Section is reversible mounting for left or right swing opening.
 - 11) Usable Depth: 28 inches (711mm).
 - 12) Vented sides and fan assembly (7217WS) with dust kit.
- b. **Color:** Black.
- c. **Quantity:** Provide as shown.

- d. **Part Number:** Great Lakes.
 - 1) 24”H x 24”W x 32”D **GL24WDXM-B-SH-AF** (For location up to 4 switches).
 - 2) 36”H x 24”W x 32”D **GL36WDXM-B-SH-AF** (For location with 5 switches or more).
 - a) Note Rail Placement: Front rails must be placed 4” away from inside edge of cabinet, and rear rails will be placed all the way to the rear of the cabinet.
- G. Cable Support System:
 - 1. Telco Backboards:
 - a. Backboards shall be 4’ x 8’ x .75” void free plywood (ACX Plywood with the “A” side turned out).
 - b. The plywood shall be painted with two coats of white fire-retardant paint.
 - c. Cut full size sheet to required size for application type, minimum 6” larger than equipment installed.
 - 2. Ladder Rack Cable Runway:
 - a. Industry Standards:
 - 1) Painted and Plated Straight Sections: UL/cULus Classified for Equipment Grounding and Load; File No. E236414.
 - 2) Curved Section and Splice Kits: UL/cULus Classified for Equipment Grounding; File No. E236414.
 - 3) cULus Bonding & Grounding:
 - a) Classified as suitable for an equipment ground conductor.
 - b) CSA C22.2 No. 126.1-02 Section 5.2.8 Load Destruction Test.
 - c) Two grounding jumper kits required per each splice kit on painted ladder rack sections.
 - 4) cULus Load Testing:
 - a) Load capacity per 10 support lengths is 369.2 lb.; safety factor of 1.5X - CSA C22.2 No. 126.1-02 Section 5.1 Electrical Continuity Test.
 - b) CSA C22.2 No. 126.1-02 Section 5.1 Electrical Continuity Test.
 - b. Application:
 - 1) The Ladder Rack System conveniently routes cables via a modular pathway through unused space on the floor, wall or ceiling while keeping cables accessible for easy maintenance. A variety of straight and curved sections are highly adaptable and can accommodate virtually any room layout.
 - c. Features:
 - 1) Section cross members welded on 9-in. (229-mm) centers.
 - 2) Accessory adjustable cross members.
 - 3) Butt-splice kits and junction-splice kits.
 - 4) Each model is boxed or bagged.
 - d. Specifications:
 - 1) Straight and curved sections made of 1-1/2-in. steel.
 - 2) Sections available in 6-, 12-, 15-, 18- and 24-in. (152-, 305-, 381-, 457- and 610-mm) widths.
 - 3) Steel connecting and mounting hardware.
 - e. Ladder rack shall be a part of a total system that includes: manufacture bends, wall supports, joining hardware, etc.
 - f. **Color:** Black.
 - g. **Quantity:** See Drawings for quantity and installation details
 - h. **Part Number:** Hoffman
 - 1) 12” W LSS12BLK
 - 2) 18” W LSS18BLK
 - 3) 24” W LSS24BLK
 - i. Contractor shall include all accessories for a finished product, including the following, as required:

- 1) **LBSKB** Butt Splice Kit
- 2) **LJSKB** Junction Splice Kit
- 3) **DGJ** Ground Strap Kit (Pack of 25)
- 4) **LCSKB** Corner Bracket
- 5) **LRD6BLK** Radius Drop 6" W (as required)
- 6) **LTSB12BLK** Triangle Wall Support
- 7) **LTSB18BLK** Triangle Wall Support
- 8) **LTSB24BLK** Triangle Wall Support
- 9) **LWASK12BLK** Wall Support, End
- 10) **LWASK18BLK** Wall Support, End
- 11) **LWASK24BLK** Wall Support, End
- 12) **LEK3B** Elevation Kit for 2-Post Racks
- 13) **LEK6B** Elevation Kit for 2-Post Racks
- 14) **LEK12B** Elevation Kit for 2-Post Racks
- 15) **LRMPBLK** Rack to Runway Mounting Plate for 2-Post Racks

3. Fiber Management :

- a. Construction:
 - 1) 24-inch diameter steel ring stores fiber slack using Velcro fasteners at regular intervals around ring.
 - 2) Screw fastens to backboard at BDF or IDF.
- b. **Color:** Black.
- c. **Quantity:** See Drawings for quantity.
- d. **Part Number:** Panduit
WMFS24

H. Grounding and Bonding:

1. Telecommunications Main Grounding Busbar (TMGB):
 - a. Telecommunications Main Grounding Busbar (TMGB) shall be constructed of .25" (6.4 mm) thick solid copper bar.
 - b. The busbar shall be 4" (100 mm) high and 12" (300 mm) long and shall have 18 attachment points (two rows of 9 each) for two-hole grounding lugs.
 - c. The hole pattern for attaching grounding lugs shall meet the requirements of ANSI-J-STD – 607-A and shall accept 15 lugs with 5/8" (15.8 mm) hole centers and 3 lugs with 1" (25.4 mm) hole centers.
 - d. The busbar shall include wall-mount stand-off brackets, assembly screws and insulators creating a 4" (100 mm) standoff from the wall.
 - e. The busbar shall be UL Listed as grounding and bonding equipment.
 - f. **Color:** N/A
 - g. **Quantity:** As required.
 - h. **Part Number: Panduit**
 - 1) **GB4B0612TPI-1**, 12" x 4" (300 mm x 100 mm) Telecommunications Main Grounding Busbar, UL Listed.
2. Telecommunications Grounding Busbar (TGB):
 - a. Telecommunications Grounding Busbar (TGB) shall be constructed of .25" (6.4 mm) thick solid copper bar.
 - b. The busbar shall be 2" (50 mm) high and 10" (250 mm) long and shall have 7 attachment points (one row) for two-hole grounding lugs.
 - c. The hole pattern for attaching grounding lugs shall meet the requirements of ANSI-J-STD – 607-A and shall accept 4 lugs with 5/8" (15.8 mm) hole centers and 3 lugs with 1" (25.4 mm) hole centers.
 - d. The busbar shall include wall-mount stand-off brackets, assembly screws and insulators creating a 4" (100 mm) standoff from the wall.
 - e. The busbar shall be UL Listed as grounding and bonding equipment.
 - f. **Color:** N/A
 - g. **Quantity:** As required.
 - h. **Part Number: Panduit**

- 1) **GB2B0304TPI-1**, 10" x 2" (250 mm x 50 mm) Telecommunications Grounding Busbar, UL Listed.
3. Horizontal Rack Busbar:
 - a. Horizontal rack-mount busbar shall be constructed of 3/16" (4.7 mm) thick by 3/4" (19.1 mm) high hard-drawn electrolytic tough pitch 110 alloy copper bar.
 - b. Bar shall be 19" EIA or 23" rack mounting width (as specified below) for mounting on relay racks or in cabinets.
 - c. Each bar shall include a copper splice bar of the same material (to transition between adjoining racks) and two each 12-24 x 3/4" copper-plated steel screws and flat washers for attachment to the rack or cabinet.
 - d. Bar shall be UL Listed as grounding and bonding equipment.
 - e. **Color:** N/A
 - f. **Quantity:** As required.
 - g. **Part Number: Panduit**
 - 1) **RGRKCBNJY**, Ground Bar for 19" Rack.
4. Two Mounting Hole Ground Terminal Block:
 - a. Ground terminal block shall be made of electroplated tin aluminum extrusion.
 - b. Ground terminal block shall accept conductors ranging from #14 AWG through 2/0.
 - c. The conductors shall be held in place by two stainless steel set screws.
 - d. Ground terminal block shall have two 1/4" (6.4 mm) holes spaced on 5/8" (15.8 mm) centers to allow secure two-bolt attachment to the rack or cabinet.
 - e. Ground terminal block shall be UL Listed as a wire connector.
 - f. **Color:** N/A
 - g. **Quantity:** As required.
 - h. **Part Number: Panduit**
 - 1) **HL1-2-25X** through **HL13-2-5**, Two Mounting Hole Ground Terminal Block, 1 each.
5. Compression Lugs:
 - a. Compression lugs shall be manufactured from electroplated tinned copper.
 - b. Compression lugs shall have two holes spaced on 5/8" (15.8 mm) or 1" (25.4 mm) centers, as stated below, to allow secure two bolt connections to busbars.
 - c. Compression lugs shall be sized to fit a specific size conductor, sizes #8 to 4/0, as stated below.
 - d. Compression lugs shall be UL Listed as wire connectors.
 - e. **Color:** N/A
 - f. **Quantity:** As required.
 - g. **Part Number: Panduit**
 - h. Compression Lugs: **LCD8-14A-L** through **LCD4/0-14B-X**
6. Antioxidant Joint Compound:
 - a. Oxide inhibiting joint compound for copper-to-copper, aluminum-to-aluminum or aluminum-to-copper connections.
 - b. **Color:** N/A
 - c. **Quantity:** As required.
 - d. **Part Number: Panduit**
 - 1) **CMP-300-4-1**, Antioxidant Joint Compound, Copper-to-Copper Connections, 4 oz, 1 each.
7. Equipment Ground Jumper Kit:
 - a. Kit includes one 24"L insulated ground jumper with a straight two hole compression lug on one end and an L-shaped two hole compression lug on the other end, two plated installation screws, an abrasive pad and a .5 once tube of antioxidant joint compound.
 - b. Ground conductor is an insulated green/yellow stripe #6 AWG wire.
 - c. Lugs are made from electroplated tinned copper and have two mounting holes spaces .5" to .625" apart that accept 1/4" screws.
 - d. Jumper will be made with UL Listed components.
 - e. **Color:** N/A

- f. **Quantity:** As required.
 - g. **Part Number: Panduit GACBJ612U**, Equipment Ground Jumper Kit, 1 each.
- I. Firestop System:
- 1. See project drawings for detailed fire caulk systems and products.
 - 2. Intumescent fire caulk:
 - a. The firestop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure.
 - b. Firestop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.
 - c. All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall use the proper firestop equipment.
 - d. Firestop systems shall be UL Classified to ASTM E814 (UL 1479).
 - e. **Color:** N/A
 - f. **Quantity:** As required.
 - g. **Part Number:** Equal to **3M or STI**
 - 1) CP25
 - 2) SSS100
 - 3. Re-Enterable Fire Stop System:
 - a. See project drawings for detailed fire thru systems and products.
 - b. The re-enterable fire stop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure.
 - c. No additional fire stopping material shall be required to obtain proper fire stopping.
 - d. The system shall offer full fire resistance whether it is empty or 100% visually filled.
 - e. The system shall be self-contained and shall automatically adjust to differing cable loads.
 - f. The system shall allow add, moves, and changes without additional materials.
 - g. All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate re-enterable fire stop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall use the proper fire stop equipment.
 - h. Fire stop systems shall be UL Classified to ASTM E814 (UL 1479).
 - i. The system shall be gang-able using wall plates for additional capacity.
 - j. **Color:** N/A
 - k. **Quantity:** See Drawing for quantity and installation details.
 - l. **Part Number:** Equal to STI
 - 1) EZDP33FWS
 - 2) EZDP33WR

PART 3 EXECUTION

3.1 WORK AREA OUTLETS

- A. Cables shall be coiled in the in-wall or surface-mount boxes if adequate space is present to house the cable coil without exceeding the manufacturer's bend radius. In hollow wall installations where box-eliminators are used, excess wire can be stored in the wall. No more

than 12" of UTP and 12" of fiber slack shall be stored in an in-wall box, modular furniture raceway, or insulated walls. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.

- B. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA 568 series, manufacturer's recommendations, and best industry practices.
- C. Work-area outlets shall consist of (1) 5-inch square recessed junction box and minimum (1) 1- 1/4" raceway to accessible ceiling space. If no accessible ceiling space exists, routing shall be provided to the nearest adjacent accessible ceiling space stubbed in the direction of least distance from the serving telecommunications room (TR). Each outlet shall be capable of accommodating up to (4) modular jacks, but as few as (1). Jack counts per work area outlet shall be installed per telecommunications plans, if no count is provided on the plans, (2) jacks shall be installed.
- D. Pair untwist at the termination shall not exceed 12 mm (one-half inch).
- E. Bend radius of the horizontal cable shall not be less than 4 times the outside diameter of the UTP cable.
- F. The cable jacket shall be maintained to within 25mm (one inch) of the termination point.
- G. Data jacks shall be identified according to district standards as outlined on drawings.
- H. There is no difference between voice and data jacks, voice cross-patching to VOIP system shall be coordinated with Owner representative.

3.2 HORIZONTAL DISTRIBUTION CABLE INSTALLATION

- A. Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
- B. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.
- C. Cable raceways shall not be filled greater than the ANSI/TIA/EIA 569 maximum fill for the particular raceway type or 40%.
- D. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
- E. Where transition points, or consolidation points are allowed, they shall be located in accessible locations and housed in an enclosure intended and suitable for the purpose.
- F. The cable's minimum bend radius and maximum pulling tension shall not be exceeded.
- G. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 to 60 inch (1.2 to 1.5 meter) intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.
- H. Horizontal distribution cables shall be bundled in groups of no more than 50 cables. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.
- I. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system

or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.

- J. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the contractor shall install appropriate carriers to support the cabling.
- K. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.
- L. Cables shall be identified by a self-adhesive label in accordance with the System Documentation Section of this specification and ANSI/TIA/EIA 606. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.
- M. Unshielded twisted pair cable shall be installed so that there are no bends smaller than four times the cable outside diameter at any point in the run and at the termination field.
- N. Pulling tension on 4-pair UTP cables shall not exceed 25-lbf for a four-pair UTP cable.
- O. Cables installed underground or below slab shall be suitable for use in wet locations and outdoors in duct or conduit. If wet location cable is exposed in the building after exiting the wet area, it must transition to an appropriate category dry cable within 50 feet (15M) of exiting conduit.

3.3 HORIZONTAL COPPER TERMINATION AND INSTALLATION

- A. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA 568 series standards, manufacturer's recommendations and best industry practices.
- B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).
- C. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
- D. Cables shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- E. The cable jacket shall be maintained as close as possible (within 25mm – 1 inch) to the termination point.
- F. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.4 OPTICAL FIBER TERMINATION HARDWARE

- A. Fiber slack shall be neatly coiled within the fiber splice tray or enclosure. No slack loops shall be allowed external to the fiber panel.
- B. Each cable shall be individually attached to the respective splice enclosure by mechanical means. The cables strength member shall be securely attached the cable strain relief

bracket in the enclosure.

- C. Each fiber bundle shall be stripped upon entering the splice tray and the individual fibers routed in the splice tray.
- D. Each cable shall be clearly labeled at the entrance to the splice enclosure. Cables labeled within the bundle shall not be acceptable.
- E. A maximum of 12 strands of fiber shall be spliced in each tray.
- F. All spare strands shall be installed into spare splice trays.

3.5 BACKBONE CABLE INSTALLATION

- A. Backbone cables shall be installed separately from horizontal distribution cables
- B. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.
- C. Where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits
- D. Where backbone cables are installed in an air return plenum, riser rated cable shall be installed in metallic conduit.
- E. Where backbone cables and distribution cables are installed in a cable tray or wireway, backbone cables shall be installed first and bundled separately from the horizontal distribution cables.
- F. All backbone cables shall be securely fastened to the sidewall of the TR on each floor.
- G. Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.
- H. Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.
- I. Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.

3.6 RACKS

- A. Wall Mounted Rack to installed per drawings.

3.7 FIRESTOP SYSTEM

- A. All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

3.8 GROUNDING SYSTEM

- A. The TBB shall be designed and/or approved by a qualified PE, licensed in the state that the work is to be performed. The TBB shall adhere to the recommendations of the ANSI/TIA/EIA- 607 standard and shall be installed in accordance with best industry practice.

- B. Installation and termination of the main bonding conductor to the building service entrance ground shall be performed by a licensed electrical contractor.

3.9 IDENTIFICATION AND LABELING

- A. The contractor shall develop and submit for approval a labeling system for the cable installation. The Owner will negotiate an appropriate labeling scheme with the successful contractor. At a minimum, the labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme. Labeling shall follow the guidelines of ANSI/TIA/EIA 606.
- B. Outside Plant cables passing through a pull box or vault shall have a cable label that is water and mud proof.
- C. All label printing will be machine generated by Ortronics, LabelMo, or similar software, using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.

3.10 TESTING AND ACCEPTANCE

- A. General:
 - 1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
 - 2. All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the Certification Program Information Manual provided by the product manufacturer and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.
- B. Copper Link Testing:
 - 1. All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category performance.
 - 2. Horizontal cabling shall be tested using a Level III test unit for category 6 and category 6A performance compliance, corresponding with the installed cable type.
 - 3. The basic tests required are:
 - a. Wire Map.
 - b. Length.
 - c. Attenuation.
 - d. NEXT (Near end crosstalk).
 - e. Return Loss.
 - f. ELFEXT Loss.
 - g. Propagation Delay.
 - h. Delay skew.
 - i. PSNEXT (Power sum near-end crosstalk loss).

- j. PSELFEXT (Power sum equal level far-end crosstalk loss).
- 4. Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicated by the test unit in accordance with the manufacturers' recommended procedures and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
- 5. Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA/EIA 568 series standards. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.
- 6. Category 6 Performance shall meet the link requirements outlined below for a 90-meter, 4-connector permanent link.
- 7. Category 6A performance shall meet the link requirements outlined below for a 90-meter, 4-connector permanent link:

Frequency (MHz)	Maximum Insertion Loss (dB)	Minimum NEXT (dB)	Minimum PSNEXT (dB)	Minimum ELFEXT (dB)	Minimum PSELFEXT (dB)	Minimum Return Loss (dB)
1.0	2.1	74.3	72.3	-	-	20.0
4.0	3.8	65.3	63.3	-	-	23.0
10.0	5.9	59.3	57.3	-	-	25.0
16.0	7.5	56.2	54.2	-	-	25.0
20.0	8.4	54.8	52.8	-	-	25.0
31.25	10.5	51.9	49.0	-	-	23.6
62.5	15.0	47.4	45.4	-	-	21.5
100.0	19.1	44.3	42.3	-	-	20.1
250.0	31.1	38.3	36.3	-	-	17.3
350.0	37.2	36.1	34.1	-	-	16.3
400.0	40.1	35.3	33.3	-	-	15.9
500.0	45.3	33.8	31.8	-	-	15.2

C. Fiber Testing:

- 1. All fiber testing shall be performed on all fibers in the completed end-to-end system. Testing shall consist of an end-to-end power meter test performed per EIA/TIA 455. The system loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 nanometers for single mode fibers. These tests also include continuity checking of each fiber.
- 2. Backbone multimode fiber cabling shall be tested at both 1310 and 1550 nm in both directions.
- 3. Test set-up and performance shall be conducted in accordance with ANSI/EIA/TIA-526 standard, Method B.
- 4. Where links are combined to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. **Only link test is required.** The contractor can optionally install patch cords to complete the circuit and then test the entire channel. The test method shall be the same used for the test described above. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
- 5. Attenuation testing shall be performed with an approved hand held tester from an industry recognized test equipment manufacturer.

3.11 SYSTEM DOCUMENTATION

- A. Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Engineer for approval. Documentation shall include the items detailed in the sub-sections below.
- B. Documentation shall be submitted within ten (10) working days of the completion of each testing phase (e.g. subsystem, cable type, area, floor, etc.). This is inclusive of all test result and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 working days of the completion of each testing phase. At the request of the Engineer, the telecommunications contractor shall provide copies of the original test results.
- C. The Engineer may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

3.12 TEST RESULTS

- A. Test documentation shall be provided on disk within three weeks after the completion of the project. The disk shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.
- B. The field test equipment shall meet the requirements of ANSI/TIA/EIA 568 series including applicable TSB's and amendments. The appropriate Level III tester shall be used to verify Category 6A cabling systems.
- C. Printouts generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. The telecommunications contractor must furnish this information in electronic form CD-ROM). If needed, provide manufacturers software require to read the test results.
- D. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

PART 4 WARRANTY AND SERVICES

4.1 WARRANTY

- A. The manufacturer shall provide the warranty directly to the end-user.
- B. The Application Assurance Warranty shall cover the failure of the wiring system to support the applications that are designed for the link/channel specifications of ANSI/TIA/EIA-568 series. These applications include, but are not limited to, 10BASE-T, 100BASE-T, 1000BASE-T, 10GBASE-T, 155Mb/s ATM, and 1Gb/s ATM.

- C. The contractor shall provide a warranty on the physical installation.

4.2 FINAL ACCEPTANCE AND SYSTEM CERTIFICATION

- A. Completion of the installation, in-progress and final inspections, receipt of the test and as-built documentation, and successful performance of the cabling system for a two-week period will constitute acceptance of the system. Upon successful completion of the installation and subsequent inspection, the end user shall be provided with a numbered certificate, from the product manufacturer, registering the installation.

END OF SECTION 27 10 00

SECTION 27 51 00 – INTERCOM-PAGING COMMUNICATIONS SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions of a Contract, including conditions of the Contract and Division 1 of the Specifications, shall apply to the Work in this Section.
- B. Drawings and general provisions of the Contract, including all portions of the Project Manual are hereby made a part of this Section. Refer to paragraph titled “Quality Assurance” in this section and to Division 01 for requirements for Communications Subcontractors. Throughout this and related Sections, “Subcontractor” shall not be limited to the singular and masculine and shall refer to one, or more than one, Communications Subcontractor. The Terms “Communications Subcontractor” and “Communications System Integrator “ shall be used interchangeably and shall be understood to represent the bidder responsible for all work of this identified in this SECTION. The “Communications Subcontractor” or “Communications System Integrator”, being one in the same shall be an authorized dealer of the product submitted for approval. Proof of authorization must be provided by the manufacturer and authorization must be shown to have been in place prior to the bid date of this project.
- C. All 120VAC power conductors and conduits associated with power circuits to all equipment locations shall be furnished and installed by Division 26 contractor.
- D. All raceway systems including but not limited to conduit, j-boxes, outlet boxes, floor boxes, & surface mounted raceway shall be furnished and installed by Division 26 contractor.

1.2 SUMMARY

- A. Work Included. The scope of work of this Section consists of the designing, installation, and programming of all materials to be furnished under this SECTION, and without limiting the generality thereof, consists of providing all labor, materials, equipment, plant, transportation, appurtenances and services necessary and/or incidental to properly complete all work as shown on the drawings, as described in the specifications, or as reasonable inferred from either or, in the opinion of the Architect and Owner, as being required and in general, is as follows:
 - 1. Public Address System, including but not limited to:
 - a. Public address system amplifiers, zone controls, back boxes, and all equipment, cabling and support required to interface the Public Address System to the Owner’s Telephone System (Not included in this contract).
 - b. Public Address System Speakers, ceiling mounted, wall mounted horn, both interior and exterior.
 - c. Cabling to support the Public Address System (NOTE: any category 5/6 cable must conform to owner guidelines. Coordinate with owner prior to submission for approval)
 - d. Equipment rack or cabinet.
 - e. PA override signal to local sound systems. Coordinate with 27 40 00 contractor.
 - f. Messaging calendar clock capable of receiving and scrolling up to 64-character custom messages without affecting or replacing display of time segments.
 - g. Predefined zones or all zones and facilitating single action activation of multiple system interface e.g. access control and CCTV or other systems as directed by owner.
- B. Actual control room and rack layouts will be based upon the specific designs submitted by

the contractors. Needs for equipment, specific speakers, etc. will be dependent on actual product manufacturers. Contractors shall coordinate room layout, actual speaker and equipment placement and programming options with owner prior to installation.

1.3 SUBMITTALS

- A. System wiring and equipment installation shall be in accordance with generally accepted engineering best practices as established by the EIA and the CEC. Wiring shall meet all state and local electrical codes. All wiring shall be tested to be free from grounds and shorts.
- B. All system wiring shall be labeled at both ends of the cable. All labeling shall be based on the room numbers as indicated in the architectural graphics package.
- C. Wiring shall be done per manufacturer's recommendation (Cat 5 or West Penn #357) depending on speaker type. All terminal connections are to be on barrier strips.

1.4 RELATED SECTIONS

- A. Section 09 90 00: Painting and Coating
- B. Section 26 05 00: Common Work Results for Electrical
- C. Section 27 00 00: Communications

1.5 SUBMITTALS

- A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:
- B. Product Literature: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for each item furnished hereunder. Ensure submittal is tabulated with index referencing the specification sections. Non-tabulated and indexed submittal shall be returned without action.
- C. Alternate systems being submitted for this bid shall provide a tabulation specification clearly comparing the submitted item with the specified item, being able to refer to all written expressed functions and capabilities. Submissions for alternates shall adhere to all the requirements of section 1.5 SUBMITTALS with the exclusion of item "L". Any requests for alternates to specified requirements must be filed by a bidding Prime Electrical Contractor and through the Architect of record and must be submitted no later than 15 days prior to the original bid date.
- D. Shop drawings; detailing the communications network system including, but not limited to, the following:
 - 1. Built-in station arrangement.
 - 2. Equipment cabinet arrangement.
 - 3. Wiring diagrams, detailing wiring for power, signal, and control, differentiating clearly between manufacturer's installed wiring and field installed wiring. Identify terminals to facilitate installation, operation and maintenance.
- E. Submit wiring diagrams showing typical connections for all equipment.
- F. Provide a riser diagram for the system showing in technically accurate detail all connections, interconnections, and all provisions available and made for adaptability of all specified future functions and including all calculations, charts, and test data necessary to demonstrate that all systems and system components deliver the specified signals, grades, and levels at all

required points and locations.

- G. Submit a valid certificate from the manufacturer indicating the distributed communications network system bidder is an authorized distributor for the system (or systems) being submitted.
- H. Submit a valid certificate of completion of installation and service training from the communications network system (or systems) manufacturer by a present employee of the systems integrator/contractor.
- I. As-built drawings: 3 sets. They should include up-to-date drawings that include any changes made to the system during installation. Circuit diagrams and other information necessary for the proper operation and maintenance of the system shall be included. Drawings must be provided on CD in AutoCAD or Revit format.
- J. All material and/or equipment necessary for the proper operation of the system, even though not specifically mentioned in the contract documents, shall be deemed part of this contract.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section for “Closeout Submittals”.
- B. Include operator instructions for each required mode of operation, routine troubleshooting procedures, manufacturer’s operation and maintenance manual for each item of equipment and accessory, and routine cleaning methods and materials.

1.7 DELIVERY, STORAGE AND HANDLING:

- A. Deliver products in factory containers. Store in clean, dry space in original containers. Protect products from fumes and construction traffic. Handle carefully to avoid damage.

1.8 QUALITY ASSURANCE

- A. To establish continuity in manufacturer, system components shall be the standard product of one manufacturer when available. The combining of multiple manufacturer components in order to meet all the performance requirements outlined and described in these specifications which includes; the internal communication, emergency display/clock, and multiple system interface is acceptable. Further, an effort shall be made to establish common sources for equipment of all systems. The manufacturer shall have a minimum of ten (10) years’ experience in the manufacture of products specified in this Section.
- B. The work to be provided under this Section consists of furnishing and installing all equipment, cabling, and labor required for complete, operable, new intercommunications systems. These systems shall be referred to as the Intercom System and their supplier as the CONTRACTOR.
- C. All empty conduit and power required for the electronic systems shall be supplied by the electrical contractor as a complete raceway system.
- D. The contractor must be a factory-authorized representative or distributor of all equipment used in the electronic systems. Further, this contractor must have a minimum of five years of experience in the specific application of the equipment proposed for these systems. Provide a letter signed by an officer of the manufacturer attesting to the contractor’s direct affiliation with the manufacturer.

1.9 REGULATORY REQUIREMENTS

- A. The entire installation shall comply with all applicable and safety codes. All central equipment and additional applicable equipment shall be listed by Underwriters' Laboratories, per U.S. requirements Note: Furnish an original, dated specimen of the test agency's listing card with the submittal.
- B. All equipment with digital apparatus (microprocessors) that generate and use timing signals at a rate in excess of 9,000 pulses per second to compute and operate must be Federal Communications Commission (FCC) and DOC CSA standards C108.8 (Electromagnetic Emissions) compliant. Any non-compliant equipment supplied or installed shall not be accepted and shall nullify the contract. Note: Provide documents supporting and verifying compliance. FCC requirements also include FCC compliance when connecting the Internal Communication System to a facility PBX/VOIP phone system as well as a direct connection to a POTS line.
- C. Systems shall be considered non-compliant unless they completely meet the criteria as outlined in this section. All supporting documentation shall be included as part of the initial submittal package. Letters regarding "future approval" or "approval pending" shall not be considered.

1.10 MAINTENANCE SERVICE

- A. The bidder supplying the equipment shall show satisfactory evidence that they maintain a fully equipped service organization capable of furnishing adequate inspection and service to the system, including replacement parts. The bidder shall be prepared to offer a service contract for the maintenance of the system after the guarantee period. The bidder shall produce evidence that they have had a fully experienced and established service organization for at least five years and proven satisfactory installations during that time.
- B. Furnish service, maintenance, and labor of communications systems for three 3 years from Date of Substantial Completion.
- C. Manufacturer shall provide factory, technical training directly to school district personnel if requested by the school district.
- D. The contractor shall provide a minimum of eight hours of in-service training with this system. These sessions shall be broken into segments, which will facilitate the training of individuals in the operation of this system. User Guides shall be provided at the time of this training.

1.11 MANUFACTURERS

- A. Bogen Communications, Inc. is the existing system. Any alternate must integrate seamlessly with this system and be reviewed prior to bid time.
- B. Any other manufacturer actively engaged in the manufacturing of systems specifically designed for K-12 internal communication and has done so for a period of no less than 10 years will be considered and deemed an equal to these specifications only after systems have been installed. The performance requirements of these specifications are as requested by the owner.
- C. Upon completion of the installation and prior to the final acceptance of the system, the owner will review the installed system and compare to the minimum performance standards as set forth in these specifications. Any installed system not meeting the minimum standards of performance as set forth in these specifications will be removed by the providing contractor

and replaced with a system referred to in these specifications as the “standard system of reference” at the expense of the Prime contractor responsible for this section of the specifications. Any additional expenses incurred up to and including the replacement and provision of the standard system of reference to meet the owner’s interpretation of the “standard system of reference” will be the sole responsibility of the Prime contractor responsible for this section of the specifications. Any delays in the schedule shall also be subject to liquidated damages as required and/or described in other sections of these specifications.

PART 2 PRODUCTS

2.1 PAGING EQUIPMENT

- A. The approved Internet Protocol Based System Controller (Gateway) shall have the following features:
 - 1. Features:
 - a. Configuration and management via a web-based graphical user interface (GUI)
 - b. Remote access from almost any PC/MAC, tablet, or mobile device
 - c. Continuous monitoring of stations and appliances to ensure system operation
 - d. Front panel power LED
 - e. SIP tie-line and turnkey support for connection to external phone systems or VoIP service providers
 - f. Station and zone capacity for any Nyquist application (determined by system license)
 - g. Talkback capability in any zone
 - h. Multicast support for all zone paging and audio distribution
 - i. Paging and announcement support across multiple facilities
 - j. Pre-recorded and (optional) text-to-speech announcements
 - k. Built-in streaming Internet radio and access to subscription-based music services
 - l. Automatic Failover option available (requires a second System Controller and software license)
 - m. Simultaneously distribute a virtually unlimited number of audio streams
 - n. Music automatically added to music library from USB port
 - o. Network-based audio that can be sourced (input) from any number of Nyquist appliances (NQ-P0100, NQ-GA20P2, etc.)
 - p. Ample storage for music files, recorded announcements, and call recordings
 - q. G722 and OPUS audio codec support to deliver superior HD audio quality
 - r. Event scheduling of tones and audio distribution to all or select paging zones
 - s. Emergency notifications that have higher priority over normal audio events
 - t. Convection air-cooled; fanless design for quiet, maintenance free operation
 - u. Wall-, Rack-, or Shelf-mountable – 1 RU package
 - v. 19” Rack Mount Kit (NQ-RMK03; sold separately)
 - 2. Technical Specifications
 - a. Video Display: HDMI, DVI-D
 - b. Network Support: Dual 10/100/1000 Mbps NICs (reserved for future use)
 - c. Protocol Support: HTTP, HTTPS, UDP, RTP, FTP, TFTP, SSH, SIP2, UNICAST, MULTICAST
 - d. Codec Support: G711, G719, G722, G723, G726, G729, OPUS, Speex, a-law, u-law, SIREN7, SIREN14, ADPCM
 - e. Connectors:
 - 1) Power: 10A Line Cord C14 IEC Inlet
 - 2) Line/MIC Input: 3.5mm Line Out/3.5mm Mic In (RESERVED FOR FUTURE USE)
 - 3) Network: 2xRJ45
 - 4) Misc. Outputs: 4 x USB 3.0 ports, 2 x Serial ports (1 x RS232, 1 x

RS232/422/485)

- f. AC Input Voltage Range: 100 VAC to 240 VAC 50/60 Hz
 - g. Maximum AC Current: 1.5A
 - h. Indicators: Power LED (front) / Network LEDs (rear)
 - i. Operating Temperature Range: 0C to +60C
 - j. Certifications: Safety: CAN/CSA C22.2 No. 62368-1; UL62368-1:2014; EN 62368-1:2014 EMC: FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - k. Physical Dimensions: (½ Rack Width x 1RU)
 - 1) Single Rack Space (1RU): 8.0"W x 1.70:H x 10.25"D
3. The Internet Protocol Based System Controller shall be Bogen Nyquist E7000 Series model # NQ-SYSCTRL
- B. The approved Analog Station Bridge shall have the following features:
1. Features:
 - a. 10/100 Ethernet
 - b. 24 station interface - Supports connections to as many as 24 individual 25V speakers
 - c. 24 dry contact closure-type analog Call Switch connections
 - d. Half-duplex talkback using speaker as pickup
 - e. CAN Bus 2.0 Interface for digital call switches and other accessory devices
 - f. 120W of embedded power shared across all 24 channels
 - g. 2 x RGB "full spectrum" LED status indicators
 - h. USB 2.0 host port, type A connector (future use)
 - i. Universal mains supply (100VAC – 240VAC)
 - j. May be rack, wall, or shelf mounted: 17.5" W x 6.9" D x 1.7" H (2" H with rubber feet installed)
 2. Technical Specifications:
 - a. AC Input Voltage Range: 100 VAC to 240 VAC 50/60 Hz
 - b. Maximum AC Current: 3.2A
 - c. AC Power Connector: 10A Line Cord; C14 IEC Inlet
 - d. Power Connector: 2-Ch. @ 120W each @ 25VRMS
 - e. S/N Ratio (20k BW): 80dB Power Output Bandwidth 20 Hz - 20 kHz < .1%
 - f. THD+N THD+N @ 1 kHz Rated Power: < .05% THD+Nt
 - g. Rated Load Impedance: 8 ohms total across all 24 outputs
 - h. Frequency Response @ 1 Watt: 20 Hz -20 kHz +/- 0.25 dB
 - i. Audio Amplifier Class of Operation: D
 - j. Input/Output Connectors: Twenty-four (24) 4-pin 3.5mm Phoenix Plugs/Headers 24 dry contact closure call switch inputs on Phoenix Plug Terminals marked "G" & "A" 24 analog speaker outputs on Phoenix Plug Terminals marked "S" & "S"; each output is rated at 40W max. @ 25VRMS While the NQ-E7030 is CAT5 or better cable compatible, it is not advisable to use category wiring for two-way intercom stations in installations where Electromagnetic Field (EMF) interference is a possible concern. In such environments, it is recommended to use West Penn #357, Belden #8724, or equivalent cabling to protect against cross-talk and noise induced by EMF interference
 - k. Audio Talkback: Half-duplex operation using the analog speaker connections on Phoenix Plug Terminals marked "S" & "S"
 - l. CAN Bus Port: 5VDC; CH (CAN Hi); CL (CAN Low); G (Ground); Bus Speed 125 kbits/sec Use Cat5 or equivalent cabling
 - m. USB Connector: USB 2.0 Type A Use USB 2.0 Cable
 - n. Indicators: Power & Status LEDs (front) / Network LEDs (front)
 - o. Cooling: Convection
 - p. Operating Temperature Range: -15 C to +40 C
 - q. Protection: ESD, RF, DC, Low Frequency, Thermal, Low Impedance, Short Circuit, Clip Limiting

- r. Networking: Cat5 or better 10/100 network connectivity to Bogen's Nyquist network
*Use Cat5 or better
 - s. Certifications: CE and FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - t. Product Weight: 5.62 lb. / 2.549 kg
 - u. Physical Dimensions: 17.63" W x 1.70" H x 7.32" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber mounting feet)
3. The Analog Station Bridge shall be Bogen Nyquist E7000 Series model # NQ-E7030
- C. The approved Matrix Mixer Pre-Amplifier shall have the following features:
- 1. Features:
 - a. 4- MIC/Line Inputs
 - 1) CH1-CH4 configurable balanced/unbalanced inputs via 3 XLR and 4 screw-terminal connections
 - 2) Any single channel can be configured to support Push-to-Talk Mic applications
 - 3) Mic inputs can be configured to supply Phantom Power when needed
 - 4) CH1 can alternately be configured as an AES3 digital input
 - b. Web-based DSP control
 - 1) 16-band Graphic Equalizer
 - 2) Signal Present and Clip Monitor
 - 3) Adjustable High Pass, Low Pass, and Bandpass Filters
 - 4) Noise Gate
 - 5) Compressor/Limiter
 - 6) 7-band Parametric Equalizer
 - c. Standalone Operation
 - d. Mixed signal can be routed to Line Out or over the Nyquist network
 - e. Nyquist network-based audio input (paging, audio distribution)
 - f. Line-Level Monitor Output to drive input to "legacy" (i.e., non-Nyquist) amplifiers
 - g. Safety: CAN/CSA C22.2 No. 62368-1:2014; UL62368-1:2014; EN 62368-1:2014
 - h. EMC: FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - i. Wall-, Rack-, or Shelf-mountable: 8.0" W x 1.70" H x 8.6" D (2" H with rubber feet installed)
 - j. 19" Rack Mount Kit (NQ-RMK03; sold separately)
 - 2. Technical Specifications:
 - a. MIC Input Sensitivity (Gain min./max.): Continuously variable from 0.1V to 0.006V RMS
 - b. MIC Phantom Power: +15 VDC
 - c. MIC Equivalent Input Noise (EIN): 100 dB
 - d. S/N Ratio (20 kHz BW): 97 dB
 - e. Line Input Sensitivity (Gain min./max.): Continuously variable from 2V to 0.1V RMS
 - f. Line Out Bandwidth: 20 Hz - 20 kHz <0.03% THD+N
 - g. Line Out Level: 3 V (+10 dB)
 - h. Line Output: 600-ohm electronically balanced, via 3-pin Phoenix on 6-pin Phoenix Plug/Header THD+N @ 1 kHz
 - i. THD+N @ 1 kHz: <0.03%
 - j. Connectors:
 - 1) Power: 10A Line Cord C14 IEC Inlet
 - 2) Line/MIC Input: Channels 1, 2 Balanced 3-pin Phoenix Plugs/Headers and Balanced 3-pin Neutrik XLRs; Channel 3 Balanced 3-pin Phoenix on 6-pin Phoenix Plug/Header and Balanced 3-pin Neutrik XLR; Channel 4 Balanced 3-pin Phoenix only via 6-pin Phoenix Plug/Header; RJ45; USB 2.0 Type A
 - 3) (PTT) Push-to-Talk Mic Connection: DDU250 or equivalent; 500-ohm impedance with a 4-conductor cable (2 shielded); PTT dry contact switch input

- on pin-5 of 6-pin Phoenix Plug/Header
 - 4) Outputs: Line Out balanced via 3-pin Phoenix on 6-pin Phoenix Plug/Header; Streaming out via Nyquist network
 - k. AES3 (IEC-60958 Type-I) Digital Input: Channel 1 alternately functions as an AES Digital Input (110-ohm Input Impedance)
 - l. AC Input Voltage Range: 85 VAC to 265 VAC 50/60 Hz
 - m. Maximum AC Current: 0.6A
 - n. Indicators: Status & Power LEDs (front) / Network LEDs (rear)
 - o. Operating Temperature Range: -15 C to +40
 - p. DSP Based Audio Features: 16-band Graphic Equalizer; Signal Present and Clip Monitor; Adjustable High Pass, Low Pass and Bandpass Filters; Noise Gate; Compressor/Limiter; 7-band Parametric Equalizer
 - q. Networking: Cat5 or better 10/100 network connectivity to Bogen's Nyquist network
 - r. Product Weight: 2.6 lbs.
 - s. Physical Dimensions: (1/2 Rack Width x 1RU)
 - 1) Single Rack Space (1RU): 8.0" W x 1.70" H x 8.6" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber mounting feet)
 - 3. The Matrix Mixer Pre-Amplifier shall be Bogen Nyquist E7000 Series model # NQ-P0100
- D. The approved Matrix Mixer Pre-Amplifier shall have the following features:
- 1. Features:
 - a. 10/100 Ethernet
 - b. PoE Class-3 (IEEE 802.3af compliant) - Optional 48 VDC 15W power supply
 - c. 8 x dry contact closure inputs (with 1 ground per 4 inputs)
 - d. 8 x relay driver outputs (500mA max per ground sink)
 - e. USB 2.0 host port, Type A connector (future use)
 - f. May be wall or shelf mounted: 5.6" W x 5.4" D x 1.7" H (2" H with rubber feet installed)
 - g. Weight 1.95 lb. / 0.885kg
 - 2. Technical Specifications
 - a. External DC Power: 48 - 56VDC .3A (5.5mm x 2.1mm Barrel Jack)
 - b. DC Input Range: 15-Watt 48V to 56V
 - c. PoE (Power over Ethernet): IEEE 802.3af standard, Class 4 device (RJ45)
 - d. Input Connectors: Two 5-pin 3.5mm Phoenix Plugs/Headers; Eight (8) dry contact closure inputs with one (1) ground per every 4 inputs; Each input is a ground activated signal (i.e., short the ground and input pin to activate; do not apply voltage) *Use 2-conductor unshielded cable of the appropriate gauge wire. Tie Ground leads together for each 5-pin input header used.
 - e. Output Connectors: Two 5-pin 3.5mm Phoenix Plugs/Headers; Eight (8) open-collector relay driver outputs with one (1) ground per every 4 outputs; Each driver is 'Normally Open' and can only sink current (i.e., it provides no voltage); Each relay driver output is rated at 50 VDC / 0.5 Amps *Use 2-conductor unshielded cable of the appropriate gauge wire. Tie Ground leads together for each 5-pin input header used. Connect ground to relay power supply ground.
 - f. USB Connector: USB 2.0 Type A 500mA *Use USB 2.0 cable
 - g. Indicators: Power & Status LEDs (front) / Network LEDs (front)
 - h. Operating Temperature Range: -15 C to +40 C
 - i. Protection: ESD, RF, DC, Thermal, Short Circuit)
 - j. Networking: Cat5 or better 10/100 network connectivity to Bogen's Nyquist network *Use Cat5 or better
 - k. Certifications: CE and FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - l. Product Weight: 1.95 lb. / 0.885 kg
 - m. Physical Dimensions: 5.6" W x 1.7" H x 5.4" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber

- mounting feet)
3. The Input/Output Controller shall be Bogen Nyquist E7000 Series model # NQ-E7010
- E. The approved 1-Channel Public Address Mixer Amplifiers shall have the following features:
1. Features:
 - a. 4 MIC/Line Inputs
 - 1) CH1-CH4 configurable balanced/unbalanced inputs via 2 XLR and 4 screw-terminal connections
 - 2) CH4 can be configured to support Push-to-Talk Mic applications
 - 3) Mic inputs can be configured to supply Phantom Power when needed
 - b. Web-based DSP control
 - 1) 16-band Graphic Equalizer
 - 2) Signal Present and Clip Monitor - Adjustable High Pass, Low Pass, and Bandpass Filters
 - 3) Noise Gate
 - 4) Compressor/Limiter
 - 5) 7-band Parametric Equalizer
 - 6) Delay / Peak Limiter
 - 7) Speaker Presets / RMS Limiter / Status
 - c. Standalone Operation
 - d. Standalone SIP Endpoint Support
 - e. 8 ohm/70V output; 600 ohm balanced line output
 - f. Nyquist network-based audio input (paging, audio distribution)
 - g. Mixed signal can be routed to Line or Speaker Out or over the Nyquist network
 - h. Safety: CAN/CSA C22.2 No. 62368-1:2014; UL62368-1:2014; EN 62368-1:2014
 - i. EMC: FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - j. 1/2 Rack Width – Wall-, Rack-, or Shelf-mountable: 8.0" W x 1.70" H x 8.6" D (2" H with rubber feet installed)
 - k. 19" Rack Mount Kit (NQ-RMK03; sold separately)
 2. Technical Specifications: (NQ-PA120 | NQ-PA240 | NQPA600)
 - a. Power Output: 120W @ 70V/8 ohms | 240W @ 70V/8 ohms | 600W @ 70V/8 ohms
 - b. Line-In Sensitivity (Gain min./max.): Continuously variable from 2V to 0.1V RMS
 - c. MIC-In Sensitivity (Gain min./max.): Continuously variable from 0.1V to 0.006V RMS
 - d. MIC Equivalent Input Noise (EIN): 100 dB
 - e. Line Out Bandwidth: 20 Hz - 20 kHz < 0.03% THD+N
 - f. Line Out: 600-ohm electronically balanced, via 3-pin Phoenix on 6-pin Phoenix Plug/Header
 - g. S/N Ratio (20 kHz BW): 97 dB
 - h. Power Output Bandwidth: 20 Hz- 20 kHz < .03% THD+N
 - i. THD+N @ 1 kHz rated power: < 0.03%
 - j. Rated Load Impedance: 8 ohms
 - k. Frequency Response @ 1 Watt: 20 Hz - 20 kHz +/- 0.25 dB
 - l. Amplifier Class of Operation: Class D
 - m. Connectors:
 - 1) Power: 10A Line Cord C14 IEC Inlet
 - 2) Inputs: Channels 1, 2 Balanced 3-pin Phoenix Plugs/Headers and Balanced 3-pin Neutrik XLRs; Channel 3 Balanced 3-pin Phoenix on 6-pin Phoenix Plug/Header; Channel 4 Balanced 3-pin Phoenix only via 6-pin Phoenix Plug/Header; RJ45; USB 2.0 Type A
 - 3) Outputs: Power Amplifier: 2-pin "touch proof" Phoenix Plug/Header Line Out balanced via 3-pin Phoenix on 6-pin Phoenix Plug/Header; streaming out via Nyquist network
 - n. AC Input Voltage Range: 85 VAC to 265 VAC 50/60 Hz
 - o. Maximum AC Current: 2A | 3A | 7A
 - p. Indicators: Status & Power LEDs (front) / Network LEDs (rear)

- q. Operating Temperature Range: -15 C to +40 C
 - r. Thermal Emissions (Full Power): 90 BTU/hr. | 135 BTU/hr. | 225 BTU/hr.
 - s. Cooling: Convection
 - t. Protection: RF, DC, Low Frequency, Thermal, Low Impedance, Short Circuit, Clip Limiting
 - u. DSP Based Audio Features: 16-band Graphic Equalizer; Signal Present and Clip Monitor; Adjustable High Pass, Low Pass, and Bandpass Filters; Noise Gate; Compressor/Limiter; 7-band Parametric Equalizer
 - v. Special Features: Sleep Mode (defeatable), Power Factor Correction (PFC), 89% Amplifier Efficiency, On/Off Muting, Bridge Mode Switch, Channel 4 PTT (Push-to-Talk)
 - w. Networking: Cat5 or better 10/100 network connectivity to Bogen's Nyquist network
 - x. Certifications: CE and FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - y. Product Weight: 5.2 lbs. | 8.3 lbs.
 - z. Physical Dimensions: 1/2 Rack Width x 1RU | 1/2 Rack Width x 2RU
 - 1) Single Rack Space (1RU): 8.00" W x 1.70" H x 13.48" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber mounting feet)
 - 2) Double Rack Space (2RU): 8.00" W x 3.43" H x 13.48" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber mounting feet)
3. The 1-Channel Public Address Mixer Amplifiers shall be Bogen Nyquist E7000 Series model # NQ-PA120 | NQ-PA240 | NQ-PA600
- F. The approved Gen-1 2-Channel Audio Power Amplifiers shall have the following features:
- 1. Features:
 - a. 1 dedicated Balanced Line Input (both Phoenix plug & XLR)
 - b. Line Input that can be routed-out over the Nyquist network
 - c. Network-based audio input (paging, audio distribution)
 - d. 4 ohm, 8 ohm, 25V, and 70V outputs
 - e. GUI based DSP control:
 - 1) 16-band Graphic Equalizer
 - 2) Signal Present and Clip Monitor
 - 3) Adjustable High Pass, Low Pass, and Bandpass Filters
 - 4) Noise Gate / Compressor/Limiter
 - 5) 7-band Parametric Equalizer / Delay / Peak Limiter
 - 6) Speaker Presets / RMS Limiter / Status Standalone Operation
 - f. Switch selectable 2-channel or 1-channel bridged operation
 - g. Safety: CAN/CSA C22.2 No. 62368-1:2014; UL62368-1:2014; EN 62368-1:2014
 - h. EMC: FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - i. 1/2 Rack Width - Wall-, Rack-, or Shelf-mountable – 1RU and 2RU packages
 - j. 19" Rack Mount Kit (NQ-RMK03; sold separately)
 - k. Standalone Operation Mode
 - l. Standalone SIP Endpoint Support
 - 2. Technical Specifications: (NQ-A2060 | NQ-A2120 | NQ-A2300)
 - a. Power Output 2-Ch. Mode (per Ch.): 60W @ 25V/4 ohms | 120W @ 25V/4 ohms | 300W @ 25V/4 ohms
 - b. Power Output 1-Ch. Bridge Mode (per Ch.): 120W @ 70V/25V/8 ohms | 240W @ 70V/25V/8 ohms | 600W @ 70V/25V/8 ohms
 - c. Line-In Sensitivity (Gain min./max.): Continuously variable from 2V to 0.1V RMS
 - d. S/N Ratio (20 kHz BW): 97 dB
 - e. Power Output Bandwidth: 20 Hz- 20 kHz < .03% THD+N
 - f. THD+N @ 1 kHz rated power: < 0.03%
 - g. Rated Load Impedance: 8 ohms / 4 ohms Non-Bridged

- h. Frequency Response @ 1 Watt: 20 Hz - 20 kHz +/- 0.25 dB
 - i. Class of Operation: Class D
 - j. Connectors:
 - 1) Power: 10A Line Cord C14 IEC Inlet
 - 2) Inputs: Balanced 3-pin Phoenix Plugs/Headers, Balanced 3-pin Neutrik XLR, RJ45, USB 2.0 Type A
 - 3) Outputs: 4-pin "touch proof" Phoenix Plug/Header
 - k. Line Inputs: 10K ohm electronically balanced, 3-pin Phoenix and 3-pin Neutrik XLR
 - l. AC Input Voltage Range: 85 VAC to 265 VAC 50/60 Hz
 - m. Maximum AC Current: 2A | 3A | 6A
 - n. Indicators: Status & Power LEDs (front) / Network LEDs (rear)
 - o. Operating Temperature Range: -15 C to +40 C
 - p. Thermal Emissions (Full Power): 90 BTU/hr. 135 BTU/hr. 225 BTU/hr.
 - q. Cooling: Convection
 - r. Protection: RF, DC, Low Frequency, Thermal, Low Impedance, Short Circuit, Clip Limiting
 - s. DSP Based Audio Features: 16-band Graphic Equalizer; Signal Present and Clip Monitor; Adjustable High Pass, Low Pass, and Bandpass Filters; Noise Gate; Compressor/Limiter; 7-band Parametric Equalizer
 - t. Special Features: Sleep Mode (defeatable), Power Factor Correction (PFC), 89% Amplifier Efficiency, On/Off Muting, Bridge Mode Switch
 - u. Networking: Cat5 or better 10/100 network connectivity to Bogen's Nyquist network
 - v. Product Weight: 4.4 lbs. | 4.4 lbs. | 6.4 lbs.
 - w. Physical Dimensions: 1/2 Rack Width x 1RU | 1/2 Rack Width x 2RU
 - 1) Single Rack Space (1RU): 8.00" W x 1.70" H x 13.48" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber mounting feet)
 - 2) Double Rack Space (2RU): 8.00" W x 3.43" H x 13.48" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber mounting feet)
3. The Gen-1 2-Channel Audio Power Amplifiers shall be Bogen Nyquist E7000 Series model # NQ-A2060 | NQ-A2120 | NQ-A2300
- G. The approved 4-Channel Audio Power Amplifiers shall have the following features:
- 1. Features:
 - a. 2 dedicated Balanced Line Input (both Phoenix plug & XLR)
 - b. Line Input that can be routed-out over the Nyquist network
 - c. Network-based audio input (paging, audio distribution)
 - d. 4 ohm, 8 ohm, 25V, and 70V outputs
 - e. GUI based DSP control:
 - 1) 16-band Graphic Equalizer
 - 2) Signal Present and Clip Monitor
 - 3) Adjustable High Pass, Low Pass, and Bandpass Filters
 - 4) Noise Gate
 - 5) Compressor/Limiter
 - 6) 7-band Parametric Equalizer
 - 7) Speaker Presets / RMS Limiter / Status
 - f. Standalone Operation:
 - 1) Switch selectable 4-channel, 30-channel, or 2-channel bridged operation
 - 2) Safety: CAN/CSA C22.2 No. 62368-1:2014; UL62368-1:2014; EN 62368-1:2014
 - 3) EMC: FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - 4) 1/2 Rack Width - Wall-, Rack-, or Shelf-mountable – 1RU and 2RU packages
 - 5) 19" Rack Mount Kit (NQ-RMK03; sold separately)
 - 6) Standalone Operation Mode

- 7) Standalone SIP Endpoint Support
 2. Technical Specifications: (NQ-A2060 | NQ-A2120 | NQ-A2300)
 - a. Power Output 4-Ch. Mode (per Ch.): 60W @ 25V/4 ohms | 120W @ 25V/4 ohms | 300W @ 25V/4 ohms
 - b. Power Output 2-Ch. Bridge Mode (per Ch.): 120W @ 70V/25V/8 ohms | 240W @ 70V/25V/8 ohms | 600W @ 70V/25V/8 ohms
 - c. Line-In Sensitivity (Gain min./max.): Continuously variable from 2V to 0.1V RMS
 - d. S/N Ratio (20 kHz BW): 97 dB
 - e. Power Output Bandwidth: 20 Hz- 20 kHz < .03% THD+N
 - f. THD+N @ 1 kHz rated power: < 0.03%
 - g. Rated Load Impedance: 8 ohms / 4 ohms Non-Bridged
 - h. Frequency Response @ 1 Watt: 20 Hz - 20 kHz +/- 0.25 dB
 - i. Class of Operation: Class D
 - j. Connectors:
 - 1) Power: 10A Line Cord C14 IEC Inlet | 10A Line Cord C14 IEC Inlet | 12A Line Cord C14 IEC Inlet
 - 2) Inputs: Balanced 3-pin Phoenix Plugs/Headers, Balanced 3-pin Neutrik XLR, RJ45, USB 2.0 Type A
 - 3) Outputs: 4-pin "touch proof" Phoenix Plug/Header
 - k. Line Inputs: Two (2) 10k ohm electronically balanced, 3-pin Phoenix and 3-pin Neutrik XLR
 - l. AC Input Voltage Range: 85 VAC to 265 VAC 50/60 Hz
 - m. Maximum AC Current: 4A | 6A | 12A
 - n. Indicators: Status & Power LEDs (front) / Network LEDs (rear)
 - o. Operating Temperature Range: -15 C to +40 C
 - p. Thermal Emissions (Full Power): 180 BTU/hr. | 270 BTU/hr. | 450 BTU/hr.
 - q. Cooling: Convection
 - r. Protection: RF, DC, Low Frequency, Thermal, Low Impedance, Short Circuit, Clip Limiting
 - s. DSP Based Audio Features: 16-band Graphic Equalizer; Signal Present and Clip Monitor; Adjustable High Pass, Low Pass, and Bandpass Filters; Noise Gate; Compressor/Limiter; 7-band Parametric Equalizer
 - t. Special Features: Sleep Mode (defeatable), Power Factor Correction (PFC), 89% Amplifier Efficiency, On/Off Muting, Bridge Mode Switch
 - u. Networking: Cat5 or better 10/100 network connectivity to Bogen's Nyquist network
 - v. Product Weight: 6.3 lbs. | 6.3 lbs. | 8.6 lbs.
 - w. Physical Dimensions: 1/2 Rack Width x 2RU
 - 1) Double Rack Space (2RU): 8.00" W x 3.43" H x 13.48" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber mounting feet)
 3. The 4-Channel Audio Power Amplifiers shall be Bogen Nyquist E7000 Series model # NQ-A4060 | NQ-A4120 | NQ-A4300
- H. The approved Color Touch Display VoIP Admin Phone shall have the following features:
1. Features:
 - a. HD Audio:
 - 1) Optima HD Voice technology combines cutting-edge hardware and software with wideband technology for maximum acoustic performance, allowing the NQ-T1100 to deliver higher HD audio quality than other VoIP phones in a high traffic network environment. And its hearing aid compatible (HAC) handset helps individuals with hearing loss to experience voices more clearly.
 - b. Easy Customization and High Expandability:
 - 1) The NQ-T1100 has a seven-inch, 800 x 480-pixel, backlit-color touch screen, which enables a rich visual presentation and easy navigation. A built-in USB 2.0 port can also be used for Bluetooth headset connectivity. The phone has 29 one-touch DSS keys which can be programmed to various features.

- c. Efficient Installation and Provisioning:
 - 1) The NQ-T1100 supports auto-provisioning to help deliver ‘zero touch provisioning’ – eliminating any complex manual settings – making the NQ-T1100 simple to deploy, easy to maintain and upgrade.
 - d. Secure Transport and Interoperability:
 - 1) The NQ-T1100 uses SIP over Transport Layer Security (TLS/SSL), which is the latest network security technology.
 - e. Audio Features:
 - 1) HD voice: HD handset, HD speaker
 - 2) Hearing aid compatible (HAC) handset
 - 3) Codecs: Opus, G.722, G.711(A/μ), G.723.1, G.729AB, G.726, iLBC
 - 4) DTMF: In-band, Out-of-band (RFC 2833) and SIP INFO Full-duplex hands-free speakerphone with AEC
 - f. Feature Keys:
 - 1) 29 one-touch DSS keys
 - 2) 7 features keys: message, headset, hold, mute, transfer, redial, hands-free speakerphone
 - 3) 6 navigation keys
 - 4) Volume control keys
 - 5) Illuminated mute, headset and hands-free speaker phone key
 - g. Phone Features
 - 1) Call hold, mute, DND
 - 2) One-touch speed dial, hotline
 - 3) Call forward, call waiting, call transfer
 - 4) Group listening, SMS, emergency call
 - 5) Redial, auto answer
 - 6) Local 3-way conferencing
 - 7) 3-way conferencing
 - 8) Call park, call pickup
 - 9) Ring tone selection/import/delete
 - 10) Set date time manually or automatically
 - 11) RTCP-XR (RFC3611), VQ-RTCPXR (RFC6035)
 - 12) USB port (2.0 compliant) for optional Bluetooth headset Enhanced DSS key
 2. A & E Specifications
 - h. The Nyquist VoIP Admin Phone (NQ-T1100) with Color Touch display panel shall show the time of date, the station numbers, and the call-in priority of staff stations that are calling in. Depending upon the system CoS programming, a VoIP Admin Phone can display menus to activate Zone Paging, All-Call Paging, Emergency All-Call Paging, alarm signals, audio files, and external functions. The Staff phone has been designed with two RJ-45 Gigabit Ethernet ports one for connection to a PoE port on the LAN and one pass through for connecting a PC or other networked device. The phone can be desk or wall mountable with included bracket. Systems that do not provide these capabilities as a minimum will not be considered equal.
 3. The Color Touch Display VoIP Admin Phone shall be Bogen Nyquist E7000 Series model # NQ-T1100
- I. The approved Plenum-Rated VoIP Intercom Modules shall have the following features:
1. Features:
 - a. PoE 802.3af compliant
 - b. Low-impedance (8 ohm) speaker output
 - c. Network-based audio output (paging, intercom, audio distribution)
 - d. Talkback support
 - e. Push-to-Talk (PTT) Microphone support (Bogen DDU250 or equivalent)
 - f. Audio input that can be routed anywhere over Bogen’s Nyquist network
 - g. DSP-based noise rejection and voice bandwidth optimization
 - h. Web-based configuration

- i. Analog Call Switch support (Bogen CA15C, or equivalent)
 - j. DCS support (Bogen NQ-E7020)
 - k. Control Relay Output
 - l. HDMI Video Output (NQ-GA10PV model only)
 - m. Automatic selection of the highest compatible display mode from probed modes of the attached HDMI display
 - n. In-wall, in-ceiling, shelf, or device mountable UL 2043 plenum-rated package
 - o. Integrated slotted mounting flanges
 - p. Optional 48VDC External Power Supply (PS4815W; sold separately)
 2. Technical Specifications: (NQ-GA10P | NQ-GA10PV)
 - a. Power Output: 10W @ 8 ohms
 - b. S/N Ratio (20k BW): 80 db
 - c. Power Output Bandwidth: 20 Hz - 20 kHz < .1%
 - d. THD+N THD+N @ 1 kHz Rated Power: < .05% THD+N
 - e. Rated Load Impedance: 8 ohms
 - f. Frequency Response @ 1 Watt: 20 Hz - 20 kHz +/- 0.25 dB
 - g. Audio Amplifier Class of Operation: D
 - h. External DC Power: 48 - 56VDC .3A (5.5mm x 2.1mm Barrel Jack)
 - i. DC Input Range: 15-Watt 48V to 56V
 - j. PoE (Power over Ethernet): IEEE 802.3 at standard, Class 3 device (RJ45)
 - k. Input/Output Connector: 12-pin Phoenix Plug/Header
 - l. CAN Bus Port (1): 5VDC; CH (CAN Hi); CL (CAN Low); G (Ground); Bus Speed 125 Kbits/sec
 - m. Call Switch Input (2): Dry Contact Closure on Phoenix Plug Terminals G & A
 - n. Analog Speaker Connection: Phoenix Plug Terminals 1 & 2
 - o. Audio Talkback: Half-Duplex using the analog speaker for talkback; Phoenix Plug Terminals 1 & 2
 - p. Ambient MIC Input: Ambient Noise Sensor Microphone (ANS500M); Phoenix Plug Terminals 1 & 2
 - q. Push-to-Talk Mic Connection: DDU250 or equivalent; 500-ohm impedance with a 4-conductor cable (2 shielded) PTT dry contact switch on Phoenix Plug Terminals G & A; Mic audio on Phoenix Plug Terminals 1 & 2
 - r. Relay Contacts: SPDT Rated 2A; NC (Normally Closed); Common; NO (Normally Open); G (Ground)
 - s. HDMI Output: N/A | HDMI 1.3 (max. 1920 x 1080 @ 30 Hz and 1280 x 720 @ 60 Hz)
 - t. Indicators: Power & Status LEDs (front) / Network LEDs (front)
 - u. Operating Temperature Range: -15 C to +40 C
 - v. Protection: ESD, RF, DC, Low Frequency, Thermal, Low Impedance, Short Circuit, Clip Limiting
 - w. Networking: Cat5 or better 10/100 network connectivity to Bogen's Nyquist network
 - x. Certifications: CE and FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017; UL 2043
 - y. Product Weight 0.7 lbs.
 - z. Physical Dimensions 3.75" W x 7/8" H x 6.2" D (Depth includes Phoenix connector)
 3. The Plenum-Rated VoIP Intercom Modules shall be Bogen Nyquist E7000 Series model # NQ-GA10P | NQ-GA10PV
- J. The approved Plenum-Rated 20W Integrated Amplifier shall have the following features:
1. Features:
 - a. Single 20-watt, 8-ohm speaker output
 - b. Single Balanced Line Output
 - c. RJ-45 for Nyquist network connection
 - d. PoE+ 802.3at compliant
 - e. Nyquist network-based audio output (paging, intercom, audio distribution)
 - f. Web-based configuration
 - g. Front panel Power and Status LEDs

- h. In-wall, in-ceiling, shelf, or device mountable UL 2043 plenum-rated package
 - i. Integrated slotted mounting flanges
 - j. Optional 48VDC External Power Supply (PS4830W; sold separately)
 - 2. Technical Specifications:
 - a. Power Output: 20W @ 8 ohms
 - b. S/N Ratio (20k BW): 80 db
 - c. Power Output Bandwidth: 20 Hz - 20 kHz < .1%
 - d. THD+N THD+N @ 1 kHz Rated Power: < .05% THD+N
 - e. Rated Load Impedance: 8 ohms
 - f. Frequency Response @ 1 Watt: 20 Hz - 20 kHz +/- 0.25 dB
 - g. Audio Amplifier Class of Operation: D
 - h. External DC Power: 48 - 56VDC .3A (5.5mm x 2.1mm Barrel Jack)
 - i. DC Input Range: 30-Watt 48V to 56V
 - j. PoE+ (Power over Ethernet): IEEE 802.3 at standard, Class 4 device (RJ45)
 - k. Power Amplifier Output Connector: 3-pin 3.5mm Phoenix Plug/Header
 - l. Audio Line Level Output Connector: 3-pin 3.5mm Phoenix Plug/Header Audio Line Level Output 2.2V RMS @10k Ω (+27 dB) Electronically Balanced
 - m. Indicators: Power & Status LEDs (front) / Network LEDs (front)
 - n. Operating Temperature Range: -15 C to +40 C
 - o. Protection: ESD, RF, DC, Low Frequency, Thermal, Low Impedance, Short Circuit, Clip Limiting
 - p. Networking: Cat5 or better 10/100 network connectivity to Bogen's Nyquist network
 - q. Certifications: CE and FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017; UL 2043; carries NRTL Safety Mark
 - r. Product Weight: 0.7 lbs.
 - s. Physical Dimensions: 3.75" W x 7/8" H x 6.2" D (Depth includes Phoenix connector)
 - 3. The Plenum-Rated 20W Integrated Amplifier shall be Bogen Nyquist E7000 Series model # NQ-GA20P2
- K. The approved VoIP Ceiling | Wall Baffle Speakers shall have the following features:
- 1. Features:
 - a. 10/100 Ethernet connection
 - b. PoE Class-3 – no local power required, IEEE 802.3af compliant
 - c. DHCP deployment for easy installation
 - d. Pre-assembled for easy installation
 - e. 10W integrated amplifier
 - f. Reset button for restoring factory settings
 - g. Form-C SPDT type 2A @ 30V DC dry contact relay output
 - h. DSP-based noise rejection and voice bandwidth optimization
 - i. MEMS digital microphone for superior talkback audio
 - j. CAN Bus 2.0 Interface connects to Nyquist Digital Call Switches (NQ-E7020)
 - k. 9.2" W x 5.2" D x 10" H (Wall Baffle)
 - l. 13" W x 3.25" dia. (Ceiling)
 - 2. Ceiling Mount Accessories
 - a. RE84 Recessed Enclosure (back box)
 - b. TB8 Tile Bridge
 - c. MR8 Mounting Ring (for installations where RE84 is not used)
 - 3. A & E Specifications
 - a. The Nyquist VoIP speaker NQ-S1810CT-G2 (ceiling) or NQ-S1810WT-G2 (wall baffle) with talkback capability shall not require traditional intercom wiring or transformer taps to manually set or adjust volume. Connecting them via Cat5 to a PoE Switch or PoE Injector on the system's network allows them to be ready to be programmed into the system. Volume control of the 10W integrated amplifier shall be controlled via the device's Web UI. The VoIP speakers shall contain one SPDT type control relay output rated at 2A @ 30V DC with the following connections: C (Normally Closed); Common;

NO (Normally Open); and G (Ground). The VoIP speakers use a wideband Opus codec for audio distribution. Use of the Opus codec, along with G.722, allows for High Definition audio. Systems that don't use Opus codecs for audio distribution shall not be considered equal. Nyquist VoIP speakers shall be equipped with a digital MEMS microphone to achieve superior talkback audio when enabled. VoIP Speakers that utilize the speaker as the microphone shall not be considered equal. The VoIP speakers shall contain a Reset button for restoring the appliance back to its factory settings.

4. The VoIP Ceiling | Wall Baffle Speakers shall be Bogen Nyquist E7000 Series model # NQ-S1810CT-G2 | NQ-S1810WT-G2
- L. The approved Digital Call Switch shall have the following features:
1. Features:
 - a. CAN Bus 2.0 Interface
 - b. Capacitive touch sensor
 - c. Full-spectrum LED ring indicates status and provides user feedback
 - d. Single gang box, low voltage installation
 - e. Includes matching white decora style plate
 - f. Software defined button behavior
 - g. Supports standard Normal/Emergency, Urgent/Emergency, and Emergency call-in modes
 - h. Each of the standard call-in modes also supports Privacy Mode
 - i. Can support room check-in when a facility is in Lockdown
 - j. Weight 0.2 lbs. / 0.091kg
 2. Technical Specifications
 - a. DC Input Voltage Range: +5VDC
 - b. Maximum DC Current: 15mA
 - c. CAN Bus Connector: One (1) 4-pin 3.5mm Phoenix-type Screw Connector
 - d. CAN Bus Interface: 5VDC; CH (CAN Hi); CL (CAN Low); G (Ground); Bus Speed 125 kbits/sec *Use 'Cat5 or equivalent cabling; Reference the NQ-E7020 Digital Call Switch Application Manual for wiring options and cable run length limits.
 - e. Capacitive Touch Sensor: High Signal-to-Noise Ratio; Multi-stage Active Noise Suppression Filters; Moisture/ Water Resistant; Adjustable Sensitivity
 - f. Indicators: Three (3) individual Full-Spectrum RGB LEDs (front)
 - g. Operating Temperature Range: -15 C to +40 C
 - h. Protection: ESD, DC, Reverse Polarity Protection, Over and Under Input Connector Voltage Protection
 - i. Certifications: CE and FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - j. Product Weight: 0.2 lbs. / 0.091kg
 - k. Physical Dimensions: Single Gang Box Compatible 1.54" W x 4.2" H x 1.15" D (Dimensions exclude attachable decora wall plate)
 3. The Digital Call Switch shall be Bogen Nyquist E7000 Series model # NQ-E7020
- M. The approved Gen-2 2-Channel Audio Power Amplifiers shall have the following features:
1. Features:
 - a. 1 dedicated Balanced Line Input (both Phoenix plug & XLR)
 - b. Line Input that can be routed-out over the Nyquist network
 - c. Network-based audio input (paging, audio distribution)
 - d. 4 ohm, 8 ohm, 25V, and 70V outputs
 - e. GUI based DSP control
 - f. 16-band Graphic Equalizer
 - g. Signal Present and Clip Monitor
 - h. Adjustable High Pass, Low Pass, and Bandpass Filters
 - i. Noise Gate
 - j. Compressor/Limiter

- k. 7-band Parametric Equalizer
 - l. Switch selectable 2-channel or 1-channel bridged operation
 - m. Safety: CAN/CSA C22.2 No. 62368-1:2014; UL62368-1:2014; EN 62368-1:2014
 - n. EMC: FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017
 - o. 1/2 Rack Width - Wall, Rack, or Shelf mountable – 1RU and 2RU packages
 - p. 19" Rack Mount Kit (NQ-RMK03; sold separately)
 - 2. Technical Specifications (NQ-A2060-G2 | NQ-A2120-G2 | NQ-A2300-G2)
 - a. Power Output 2-Ch. Mode (per Ch.): 60W @ 25V/4 ohms | 120W @ 25V/4 ohms | 300W @ 25V/4 ohms
 - b. Power Output 1-Ch. Bridged Mode (per Ch.): 120W @ 70V/25V/8 ohms | 240W @ 70V/25V/8 ohms | 600W @ 70V/25V/8 ohms
 - c. Line-In Sensitivity (Gain min./max.): Continuously variable from 2V to 0.1V RMS
 - d. S/N Ratio (20 kHz BW): 97 dB
 - e. Power Output Bandwidth: 20 Hz- 20 kHz < .03% THD+N
 - f. THD+N @ 1 kHz rated power: < .03%
 - g. Rated Load Impedance (min. per Ch.): 8 ohms Bridged / 4 ohms Non-Bridged
 - h. Frequency Response @ 1 Watt: 20 Hz- 20 kHz +/- 0.25 dB
 - i. Class of Operation: Class D
 - j. Connectors:
 - k. Power: 10A Line Cord C14 IEC Inlet
 - l. Input: Balanced 3-pin Phoenix Plug/Header, Balanced 3-pin Neutrik XLR, RJ45, USB 2.0 Type A
 - m. Output: 4-pin "touch proof" Phoenix Plug/Header
 - n. Line Inputs: 10k ohm electronically balanced, 3-pin Phoenix and 3-pin Neutrik XLR
 - o. AC Input Voltage Range: 85 VAC to 265 VAC 50/60 Hz
 - p. Maximum AC Current: 2A | 3A | 6A
 - q. Indicators: Status & Power LEDs (front) / Network LEDs (rear)
 - r. Operating Temperature Range: -15 C to +40 C
 - s. Thermal Emissions (Full Power): 90 BTU/hr. | 135 BTU/hr. | 225 BTU/hr.
 - t. Cooling: Convection
 - u. Protection: RF, DC, Low Frequency, Thermal, Low Impedance, Short Circuit, Clip Limiting
 - v. DSP Based Audio Features: 16-band Graphic Equalizer; Signal Present and Clip Monitor; Adjustable High Pass, Low Pass, and Bandpass Filters; Noise Gate; Compressor/Limiter; 7-band Parametric Equalizer
 - w. Special Features: Sleep Mode (defeatable), Power Factor Correction (PFC), 89% Amplifier Efficiency, On/Off Muting, Bridge Mode Switch
 - x. Networking: Cat5 or better 10/100 network connectivity to Bogen's Nyquist network
 - y. Product Weight: 4.4 lbs. | 4.4 lbs. | 6.4 lbs.
 - z. Physical Dimensions: 1/2 Rack Width x 1RU | 1/2 Rack Width x 2RU
 - aa. Single Rack Space (1RU): 8.00" W x 1.70" H x 13.48" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber mounting feet)
 - bb. Double Rack Space (2RU): 8.00" W x 3.43" H x 13.48" D (Depth includes Phoenix connectors; width is without rack mount brackets attached; height excludes rubber mounting feet)
 - 3. The Gen-2 2-Channel Audio Power Amplifiers shall be Bogen Nyquist E7000 Series model # NQ-E7020
- N. The approved Staff Phone-LCD Display shall have the following features:
- 1. Features:
 - a. HD Audio:
 - b. HD Voice refers to the combination of the phone's software and hardware design, as well as the implementation of wideband technology to maximize acoustic performance.

Coupled with advanced acoustic clarity technologies, such as full duplex operation, echo cancellation, adaptive jitter buffer, etc., the NQ-T2000 provides clearer, more life like voice communications.

- c. Enhanced Call Management:
 - d. The NQ-T2000 supports numerous productivity-enhancing features such as busy lamp field, call park, call pickup, call forward, call transfer, and 3-way conference.
 - e. Efficient Installation and Provisioning:
 - f. Integrated IEEE 802.3af Power-over-Ethernet (PoE) capability allows easy deployment with centralized powering and backup. The NQ-T2000 supports auto-provisioning via the E7000 system server for mass deployment.
 - g. Secure Transport and Interoperability:
 - h. The NQ-T2000 uses SIP over Transport Layer Security (TLS/SSL), which is the latest network security technology.
 - i. Audio Features
 - j. HD voice: HD handset, HD speaker
 - k. Wideband codec: G.722 , Opus
 - l. Narrowband codec: G.711(A/μ), G.723.1, G.729AB
 - m. DTMF: In-band, Out-of-band (RFC 2833) and SIP Information
 - n. Full-duplex hands-free speaker phone with AEC
 - o. Phone Features
 - p. Call hold, mute, DND
 - q. One-touch speed dial, hotline
 - r. Call forward, call waiting, call transfer
 - s. Group listening, SMS, emergency call
 - t. Redial, auto answer
 - u. Local 3-way conferencing
 - v. Ring tone selection/import/delete
 - w. Set date time manually or automatically
 - x. RTCP-XR (RFC3611)
2. A & E Specifications
- a. The Nyquist VoIP Staff Phone (NQ-T2000) with LCD display panel shall show the time of date and the station numbers and call-in priority of staff stations that are calling in. Depending upon the system CoS programming, a VoIP Staff Phone can display menus to activate Zone Paging, All-Call Paging, Emergency All-Call Paging, alarm signals, audio files, and external functions. The Staff phone has been designed with two RJ-45 Gigabit Ethernet ports one for connection to a PoE port on the LAN and one passthrough for connecting a PC or other networked device. Desk or wall mountable with included bracket. Systems that do not provide these capabilities as a minimum will not be considered equal.
3. The Staff Phone-LCD Display shall be Bogen Nyquist E7000 Series model # NQ-T2000
- O. The approved BCMA 3000 Series Master Clock (V7.1) shall have the following features:
- 1. Features:
 - a. Available in Rack or Wall Mount Designs
 - b. LED display for a clear, accurate readout
 - c. Two-line, backlit LCD display with 20 characters per line
 - d. 2x8 rubber push button keypad for easy on-site programming
 - e. Automatic bi-annual Daylight-Saving Time changes (if applicable)
 - f. Capable of interfacing and providing time data to third-party clock systems
 - g. Supports 59-minute correction, 58-minute correction, National Time/Rauland, Rauland Digital
 - h. Dukane Digital, input only
 - i. Bias seconds output
 - j. Adjust the time plus or minus a few seconds or minutes to fit your application
 - k. RS485 input and output for time correction and synchronization
 - l. 12 or 24 Hour Mode

- m. Microprocessor based
 - 2. Specifications:
 - a. Housing: Smooth surface metal case
 - b. Color: Black
 - c. Mounting: Wall Mount or Rack Mount
 - d. Display: 0.56" (1.42cm) LED display
 - e. Housing Dimensions (LxWxD): 11.0" x 17.5" x 1.75" (27.94 cm x 44.45 cm x 4.45 cm)
 - f. Weight: 6.5 lbs. (2.95 kg)
 - g. Time Base: Crystal
 - h. Memory: Non-volatile EERPROM
 - i. Temperature Range:
 - j. Operating: 32°F – 113°F (0°C - 45°C)
 - k. Shelf: 5°F – 167°F (-15°C - 75°C)
 - l. Voltage Input: 85 VAC – 264 VAC, 50/60 Hz
 - m. Current Consumption: 0.2A at 120V and 0.1A at 230V
 - n. Power Consumption: 20 Watts
 - o. Inputs: RS485, 59 minute correction, 58 minute correction, National Time and Rauland, Rauland digital, Dukane digital, Once a Day Pulse, GPS (optional), (S)NTP, Wireless Repeater (optional)
 - p. Outputs: RS485, 2 clock circuits, Once a Day Pulse, Wireless Communication (optional), (S)NTP (optional)
 - 3. The approved BCMA 3000 Series Master Clock (V7.1) shall be equal to the Bogen, Model# BCMA-3R0-1108-1.
 - a. Contractors to include the following with the BCMA 3000 Series Master Clock (V7.1):
 - b. BCMA 3000 Series Software Upgrade to (S)NTP Server: BCMA-000-SERV-0
 - c. Countdown Feature (for digital clocks with relays): BCMA-000-CDOW-0
- P. The approved Wireless Repeater (V2) shall have the following features:
- 1. Features:
 - a. Wirelessly receives the time signal either from the master clock or a wireless clock and re-transmits it
 - b. Perfect for applications with longer distances between clocks
 - c. Works on Bogen's 915-928 MHz frequency hopping technology
 - d. Available using Bogen's 2.4 GHz frequency hopping technology (for international use only)
 - e. Transmits up to 1000 meters in open space
 - f. Powerful 30dBm transmission
 - g. Extremely slim design makes the Wireless Repeater versatile for mounting
 - h. No need for custom utility box
 - i. FCC compliant, part 15, section 15,247
 - 2. Specifications:
 - a. Input voltage: 85 - 230 Volts AC
 - b. Input: Bogen Wireless Communication, RS485
 - c. RF Power Output: 30 dBm (1 watt)
 - d. Frequency Range:
 - e. 915-928 MHz frequency hopping technology
 - f. 2.4 GHz frequency for international use only
 - g. Mounting: Wall mount
 - h. Temperature Range:
 - i. Operating: 0°C - 50°C
 - j. Storage: -15°C - 70°C
 - k. Housing: Smooth surface metal enclosure
 - l. Color: Black
 - m. Shipping Weight: 4 lbs
 - n. Antenna Length: 7" (17.78 cm)

- o. Housing Dimensions: (LxWxD): 11" x 8" x 1.7" (27.94 cm x 20.32 cm x 4.32 cm)
 - p. Compliance: FCC compliant, part 15, section 15,247
 - 3. The approved Wireless Repeater (V2) shall be equal to the Bogen, Model# 915-928 MHz frequency: BCMA-1SR-0000-1
- Q. The approved BCAL Series Wireless 900MHz Round Clock (V5.5) shall have the following features:
- 1. Features:
 - a. Available in 9", 12", and 16" dial sizes
 - b. Offered in a Standard or Slim-Line ABS case
 - 1) Optional Cherry Wood finish or Brushed Aluminum Finish
 - c. Provided with mounting hardware for easy installation
 - d. Hour, minute, and seconds hands
 - e. Quick correction for time change (Max. 5 minutes)
 - f. Microprocessor based movement
 - g. Internal Antenna
 - h. Side molded, polycarbonate crystal
 - i. FCC Compliant per FCC part 15 Section 15,247
 - 2. Specifications:
 - a. Case Material:
 - 1) Acrylonitrile Butadiene Styrene (ABS).
 - 2) Cherry wood finish or brushed aluminum finish for the Slim-Line ABS case is also available.
 - b. Case Color: Standard black finish (custom colors available)
 - c. Dial Face: 12 or 24 (military) hour standard Specialty dials available
 - d. Crystal Material: Shatter-proof, side-molded, transparent polycarbonate
 - e. Voltage Input:
 - 1) Two 1.5V "D" Cell Alkaline Batteries (Battery model)
 - 2) 7 – 28 VDC/VAC 50/60 Hz (24V model)
 - 3) 85 – 130 VAC 50/60 Hz (110V model)
 - 4) 180 – 260 VAC 50/60 Hz (230V model)
 - f. Average Current Consumption:
 - 1) Battery – 5 years (standard mode)
 - 2) 8 years (economy mode)
 - 3) 35 mA @ 24DC/VAC
 - 4) 25 mA @ 110VAC
 - 5) 15 mA @ 230VAC
 - g. Operating frequencies:
 - 1) 915-928 MHz while frequency-hopping
 - h. Transceiver parameters:
 - 1) Transmitter power output: 8 dbm
 - 2) Receiver sensitivity: -103 dbm
 - i. Hand Tolerance:
 - 1) Minute hand: +/- ¼ minute
 - 2) Second hand: +/- ½ second
 - j. Temperature range:
 - 1) Operating: 32°F - 113°F (0°C - 45°C)
 - 2) Shelf: 5°F - 167°F (-15°C - 75°C)
 - k. Compliance:
 - 1) UL and cUL listed, FCC part 15 Section 15,247
 - 3. The approved BCAL Series Wireless 900MHz Round Clock (V5.5) shall be equal to the Bogen, Model# BCAL-2BS-12R-0
- R. Equipment Racks
- 1. All equipment racks shall provide 44 spaces (77") minimum for mounted system equipment.

2. All equipment racks shall be multi-rack format (“gangable”) style, bolted together, and open cavity.
3. All equipment racks will be provided with lockable rear doors.
4. Equipment rack(s) shall be located in climate-controlled areas/rooms as shown on drawings.
5. All head-end, distribution, and source equipment, including data and power, shall be located in racks configured as approved by the Engineer.
6. Rack mounted equipment shall be accessible from front and rear.
7. All unused rack spaces will be covered with appropriate blank/vent panels.
8. The intercom p.a. source equipment will mount in these approved data racks at a good working level approximately shoulder height.
9. The cables to/from the source equipment must be terminated on 66-M150 telephone type punch blocks and NEVER on 110 computer type punch blocks. The 66-M150 punch blocks must be snapped onto 89B brackets, and the 89B brackets must be mounted to telephone style blue boards either half or full size as necessary.
10. The blue boards must be mounted to one of the appropriate equipment room walls at a good working height.
11. The “house” cables for the speakers and any feeder cables must also be terminated on 66- M150 cables, NEVER on 110 type blocks.

S. Wire & Cables

1. The approved Ceiling Speaker Cable shall be:
 - a. 18awg stranded (7x26awg) ASTM bare copper
 - b. 2 conductor twisted pair cable with PVC insulation and a Gray PVC jacket.
 - c. The approved Speaker Cable shall be equal to West Penn, PN# 224.
2. The approved low frequency Speaker Cable shall be:
 - a. 12awg stranded (19x25awg) ASTM bare copper
 - b. 2 conductor twisted pair cable with PVC insulation and a Gray PVC jacket.
 - c. The approved Game Speaker Cable shall be equal to West Penn, PN# 227.
3. The approved Microphone Cable shall be:
 - a. 20awg stranded (7x28awg) ASTM tinned copper
 - b. 2 conductor twisted pair cable with PVC insulation and a Gray PVC jacket.
 - c. Cable shall have an overall 100% aluminum polyester foil shield and a 22awg tinned copper drain wire.
 - d. The approved Microphone Cable shall be equal to West Penn, PN# 292.
 - e. The approved inter-rack cabling shall be:
 - f. 20awg stranded (7x28awg) ASTM tinned copper
 - g. 2 conductor twisted pair cable with PVC insulation and a Gray PVC jacket.
 - h. Cable shall have an overall 100% aluminum polyester foil shield and a 22awg tinned copper drain wire.
 - i. The approved cable shall be equal to West Penn, PN# 452
 - j. Connectors: 3.5mm Stereo Male to 3.5mm Stereo Male
 - k. Fully molded connectors provide strain relief
 - l. Braided shield prevents unwanted EMI/RFI interference
 - m. Nickel-plated connectors
 - n. The approved cable shall be equal to Cables To Go, PN# 40412
 - o. Connectors: (2) RCA Male Plug to (2) RCA Male Plug
 - p. Bonded construction design for neat, easy connection of audio signals
 - q. Oxygen-free copper conductors deliver high-quality audio
 - r. 100% foil and OFC shield protects against noise and interference
 - s. Twisted pair construction of audio conductors fight noise and hum.
 - t. Corrosion-resistant, precision 24K gold-plated connectors ensure long-lasting quality
 - u. Ultra-flexible jacket for easy installation
 - v. The approved cable shall be equal to Cables To Go, PN# 13032
 - w. Connectors: 3.5mm Stereo Male to 2x RCA Stereo Male
 - x. Fully molded connectors provide strain relief

- y. Foil shielded to prevent unwanted EMI/RFI interference
- z. Gold-Plated connectors
- aa. The approved cable shall be equal to Cables To Go, PN# 40613

T. Electrical Power Equipment

1. The approved Secondary Power Strip shall have:
 - a. Shall be a one-rack-space unit in a magnetic shielding steel enclosure.
 - b. Shall operate from 120 volts AC and have a 9-foot, grounded, 3-wire #14-line cord.
 - c. There shall be 8 grounded AC receptacles on the back panel, with 6 switched and 2 always on.
 - d. Overall dimensions shall be 1.75" H x 19" W x 10.5" D.
 - e. Weight shall be 11 pounds.
 - f. Shall have a load rating of 15 amps at 120 volts, a self-test circuit with visual indicator, and provide EMI/RFI filtering, inrush current elimination and catastrophic over/under-voltage shutdown.
 - g. It shall meet Federal Grade A, Class 1, Mode 1 guidelines for powerline surge suppressors and withstand at least 1000 occurrences of surge pulse voltages up to 6000 volts.
 - h. Thermal circuit breaker overload protection
 - i. Self-test circuit with visual indicator
 - j. 10-year warranty
 - k. Made in U.S.A.
2. The approved Power Sequencer shall be equal to the SurgeX, Model# SX1115.

U. The Bogen Sample BOM shall include all equipment/materials listed in the below table.

1. All Contractors are to Contact Bogen before submitting any bids.
2. Contractors may use the below table information as reference only to create their own BOM total quantities per site.
3. Contractors are to include any and all necessary mounting hardware, cabling, enclosures, racks, licensing with their quotes.
4. Bogen Sample BOM Scope of Work:
 - a. This Bogen Sample BOM is for retro-fit of the existing Intercom master equipment with a new BOGEN E7000 Nyquist 48-Port System using the existing intercom equipment rack. Also existing campus intercom speakers, clocks and cabling will be reused and incorporated into the new Intercom system head-end. New equipment will interface into the LAN for desktop and remote access. All system software and licenses are included. Also included is an extended 1 year software maintenance agreement which will cover the initial 2 years of system operation. This include end user tech support, software updates and enhancements. All software licenses are owned by KCUSD the extended agreement is only for maintenance. After the initial 2 year period expires KCUSD may then elect to extend the software maintenance plan in 1yr, 3yr, or 5yr blocks at it's discretion.
5. The below table is an example of the manufacture pre-configured equipment list for one (1) Site.

Bogen Sample BOM for Modernization Upgrade			
Item	Part Number	Description	Quantity
1	NQ-SYSCTRL	Bogen Nyquist System Controller (H/W Only)	1
2	NQ-E7030	Bogen Nyquist Analog Station Bridge	2
3	NQ-P0100	Bogen Nyquist 4-Channel Matrix Mixer Pre-Amp	1
4	NQ-E7010	Bogen Nyquist Input/Output Controller	1
5	NQ-T1100	Bogen Nyquist Color Touch Display VoIP Admin Phone	1

6	NQ-RMK01	Bogen Nyquist 1U Rack Mount Kit Type-1	1
7	NQ-RMK02	Bogen Nyquist 1U Rack Mount Kit Type-2 (Single I/O or GA20P2)	1
8	Bogen	Bogen E7000 Educational System Software – System License	1
9	Bogen	Bogen E7000 Educational System Software – Station License (Pack 25)	2
10	Bogen	Bogen E7000 Educational System Software – Concurrent Call License (Pack 10)	1
11	Bogen	Bogen 1-Year Extended System S/W License Maintenance	1
12	Bogen	Bogen 1-Year Extended Concurrent Call S/W License Maintenance	1
13	Bogen	Bogen 1-Year Extended Station S/W License Maintenance	2
14	SPA112	Cisco SPA112 Phone Adapter	1
15	M1-50R	Siemon Prewired Block, S66, M Series 4x50, 25 Pair, Front Punch, (1) 25 Pair Female Connector, S89D Bracket, Hinged Cover, Orange Cover	2
16	S89D	Siemon Stand-Off Bracket for S66 Block	2
17	ICPCSTMM25	ICC 25 Pair Amphenol Cable Assembly, Male to Male, 25ft	2
18	UTP28SP3	Panduit Cat6 28 AWG UTP Copper Patch Cord, 3ft, IW	5
19	7133800	General Cable – GenSPEED 6 Cat6 Cable, CMR, U/UTP, Blue	1
20	JP131W-L20	Panduit – J-hook with mounting bracket	10

This Material List has been configured by Bogen with the design information provided by the District and Consultant. The CONTRACTOR shall verify that this material is the correct material prior to bidding and prior to ordering. It is the CONTRACTORS responsibility for a complete system whether listed here or not.

- V. The Bogen Sample BOM shall include all equipment/materials listed in the below table.
1. All Contractors are to Contact Bogen before submitting any bids.
 2. Contractors may use the below table information as reference only to create their own BOM total quantities per site.
 3. Contractors are to include any and all necessary mounting hardware, cabling, enclosures, racks, licensing with their quotes.
 4. Bogen Sample BOM Scope of Work:
 - a. This Bogen Sample BOM is for installing a new BOGEN E7000 Nyquist 48-Port System using the new intercom equipment rack. Also new campus intercom speakers, clocks and cabling will be contractor installed and incorporated into the new Intercom system head-end. New equipment will interface into the LAN for desktop and remote access. All system software and licenses are included. Also included is an extended 1 year software maintenance agreement which will cover the initial 2 years of system operation. This include end user tech support, software updates and enhancements. All software licenses are owned by KCUSD the extended agreement is only for maintenance. After the initial 2 year period expires KCUSD may then elect to extend the software maintenance plan in 1yr, 3yr, or 5yr blocks at it's discretion.
 5. The below table is an example of the manufacture pre-configured equipment list for one (1) Site.

Bogen Sample BOM for Modernization Upgrade

Item	Part Number	Description	Quantity
1	NQ-SYSCTRL	Bogen Nyquist System Controller (H/W Only)	As Required
2	NQ-E7030	Bogen Nyquist Analog Station Bridge	As Required
3	NQ-P0100	Bogen Nyquist 4-Channel Matrix Mixer Pre-Amp	As Required
4	NQ-E7010	Bogen Nyquist Input/Output Controller	As Required
5	NQ-PA120/240/600	Bogen Nyquist 1-Channel Public Address Mixer Amplifiers	As Required
6	NQ-A2300	Bogen Gen-1 Nyquist 2-Channel Audio Power Amplifiers	As Required
7	NQ-A4060/A4120/A4300	Bogen Nyquist 4-Channel Audio Power Amplifiers	As Required
8	NQ-T1100	Bogen Nyquist Color Touch Display VoIP Admin Phone	As Required
9	NQ-GA10P/NQ-GA10PV	Bogen Nyquist Plenum-Rated VoIP Intercom Modules	As Required
10	NQ-GA20P2	Bogen Nyquist Plenum-Rated 20W Integrated Amplifier	As Required
11	NQ-S1810CT-G2	Bogen VoIP Ceiling Baffle Speakers	As Required
12	NQ-S1810WT-G2	Bogen VoIP Wall Baffle Speakers	As Required
13	NQ-E7020	Bogen Digital Call Switch	As Required
14	NQ-A2060-G2/A2120-G2	Bogen Gen-2 Nyquist 2-Channel Audio Power Amplifiers	As Required
15	BCMA-3R0-1108-1	Bogen BCMA 3000 Series Master Clock (V7.1)	As Required
16	BCMA-000-SERV-0	Bogen BCMA 3000 Series Software Upgrade to (S)NTP Server	As Required
17	BCMA-1SR-0000-1	Bogen Wireless Repeater (V2)	As Required
18	BCAL-2BS-12R-0	Bogen BCAL Series Wireless 900MHz Round Clock (V5.5)	As Required
19	NQ-RMK01	Bogen Nyquist 1U Rack Mount Kit Type-1	As Required
20	NQ-RMK02	Bogen Nyquist 1U Rack Mount Kit Type-2 (Single I/O or GA20P2)	As Required
21	Bogen	Bogen E7000 Educational System Software – System License	As Required
22	Bogen	Bogen E7000 Educational System Software – Station License (Pack 25)	As Required
23	Bogen	Bogen E7000 Educational System Software – Concurrent Call License (Pack 10)	As Required
24	Bogen	Bogen 1-Year Extended System S/W License Maintenance	As Required
25	Bogen	Bogen 1-Year Extended Concurrent Call S/W License Maintenance	As Required
26	Bogen	Bogen 1-Year Extended Station S/W License Maintenance	As Required
27	SPA112	Cisco SPA112 Phone Adapter	As Required
28	M1-50R	Siemon Prewired Block, S66, M Series 4x50, 25 Pair, Front Punch, (1) 25 Pair Female Connector, S89D Bracket, Hinged Cover, Orange Cover	As Required
29	S89D	Siemon Stand-Off Bracket for S66 Block	As Required

30	ICPCSTMM25	ICC 25 Pair Amphenol Cable Assembly, Male to Male, 25ft	As Required
31	UTP28SP3	Panduit Cat6 28 AWG UTP Copper Patch Cord, 3ft, IW	As Required
32	7133800	General Cable – GenSPEED 6 Cat6 Cable, CMR, U/UTP, Blue	As Required
33	JP131W-L20	Panduit – J-hook with mounting bracket	As Required

This Material List has been configured by Bogen with the design information provided by the District and Consultant. The CONTRACTOR shall verify that this material is the correct material prior to bidding and prior to ordering. It is the CONTRACTORS responsibility for a complete system whether listed here or not.

PART 3 EXECUTION

3.1 MATERIALS

- A. **WIRE:** Wire shall be #22 gauge at a minimum. Wire for communications system shall consist of 2 twisted pairs #22 solid copper under plenum jacket. No splices are permitted except in approved junction boxes. All terminations shall be made on telephone type punch blocks or at specified devices. Display, speaker, and specialty cables shall be as required for best operation under manufacturer recommendations.
- B. **JACKS:** All station device terminations (except speakers) shall be terminated on USOC standard modular jacks. Jacks for wall mounted telephones shall have lugs for securely attaching the instrument to the wall.
- C. **BACKBOARDS:** Provide 4 feet x 8 feet plywood backboards for mounting of system cross connect field. Mount as shown on the plans. Provide Modular Termination backboards with 110 type terminal blocks as required to terminate all cables. Provide Distribution and cross connect backboards equal to AT&T 110 Series for all cross connect wiring.
- E. **TERMINAL CABINETS:** A terminal cabinet with a sufficient number of bushed openings shall be installed in the wall behind the Intercom Control Console equipment rack. Cabling between the equipment rack and the main junction box shall be provided with telephone type
- F. 50 pin connectors to allow ease in console connections, disconnection's and service. Satellite terminal junction boxes shall be provided as needed to allow for station terminations in each building.

3.2 INSTALLATION:

- A. All work under this section shall be performed by persons having specific familiarity with telephone, data and sound system installation. Upon request the contractor shall submit resumes, references, or other corroborating documentation, to the engineer to confirm the contractor's capabilities and experience.
- B. **GROUNDING:** Except were specifically indicated otherwise, all exposed non-current carrying metallic parts of the communications system shall be grounded. This may be accomplished via a driven ground rod, cold water pipe or building power ground. If the building power ground is used, a separate ground conductor shall be used from the equipment to the grounding grid. All grounding shall be done with #6 solid copper wire or larger. The contractor shall use every effort to insure system stability and safety.

- C. **WIRING:** A comprehensive, documented communications wiring system is to be installed. Wiring is to be identified by room number, segregated, neatly laced, and terminated on telephone type punch blocks. Back boards and cross connect fields shall be neatly organized as to function. (ie: intercom, telephone stations, data network etc.) All termination points are to be labeled with function. Data cables shall be certified as usable and checked using the cable certification sheet. Data cables shall be labeled as per the data identification scheme.
- D. **SPEAKER WATTAGE TAPS:** Tap all classrooms at ½ watt. Tap Corridor Speakers for 1 watt, Outside Horns 3.3 watts, Tap Speakers in High Ceilings (15FT +) at 4 watts. Rest rooms ½ watt.

3.3 TESTING AND TRAINING:

- A. Prior to connection of any terminal equipment all cables shall be tested as per REA spec. PC-4. Cables shall be tested for Opens, Splits, Crossed Pairs, Shorts to Ground and Shield Continuity. All defective cabling is to be replaced prior to device hook-up.
- B. Upon completion of the installation the contractor shall test each room station speaker, handset or call switch for proper operation. All telephones, programming and functions are to be tested for proper operation. All emergency and program functions are to be tested. Any malfunction shall be corrected prior to final acceptance.
- C. A minimum of eight (8) hours time, broken into four (4) two (2) hour sessions, shall be included in the bid for instruction of the owners forces in proper operation and routine maintenance of the system. Instruction shall cover all materials indicated in the owners and operations manual.
- D. Operational guidelines shall be given in written form in sufficient numbers so that all key personnel have operational instructions of programming, station use and special features.
- E. Copies of these instructions shall be provided for permanent record in the operations and maintenance manuals specified in part 1.04 above.

END OF SECTION 27 51 00

SECTION 28 46 00 - FIRE DETECTION AND ALARM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section Includes:
1. Provide additions and modifications to an existing campus-wide addressable fire detection and alarm system.
 2. Replace certain addressable system smoke detectors with new combination smoke-heat-carbon monoxide detectors where shown on the drawings. Provide new addressable remote power supplies to provide supervised 24 volt power to the new carbon monoxide detectors and related sounder bases.
 3. Except for the specific work described above, the existing fire detection and alarm system is functional and compliant and is to remain. The fire alarm work of this project is limited to the provision of carbon monoxide detectors and the related work this will occasion.
 4. Testing: The completed system shall be tested in accordance with NFPA Standard 72-7-1.
 5. Fire alarm wiring shown in drawings shall be installed in raceway.
 6. Instruction for Owner Representatives. Training shall consist of a minimum of two 2-hour sessions.
 7. Coordination with Section 26 05 33: Raceway and Boxes for Electrical Systems.
 8. Furnishing of special back boxes where required for installation of fire alarm devices.
 9. Qualifications: Contractor shall receive written approval and verified test results which shall be submitted to the owner for system from manufacturers recognized representative prior to completion and acceptance.
 10. Initiating devices shall be separately addressed for individual identification at control panel.
 11. As-Built Drawings: A complete set of reproducible "as-built" drawings showing installed wiring, color coding, wire tag notations 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 the system.
 12. Maintenance Instructions: Three (3) submittals of maintenance instructions shall be provided and shall be complete, easy to read, understandable and shall provide the following information:
 - a. Instructions for replacing any of the new components of the system, including internal parts.
 - b. Instructions for periodic cleaning and adjustments of new equipment with a schedule of these functions.
 - c. A complete list of new equipment and components with information as to the address and telephone number of both the manufacturer and local supplier of each item.
 - d. User operating instructions shall be prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864. The contractor shall warrant new equipment and wiring free from inherent mechanical and electrical defects for two years from the date of final acceptance.

1.3 SUBMITTALS

- A. Comply with applicable provisions of Section 26 05 00: Common Work Results for Electrical.
- B. Submit the manufacturer's cut sheets and the CSFM Listing Sheets for these items:
 - 1. Addressable remote power supply panels.
 - 2. Addressable multi-criteria fire/ carbon monoxide detectors with sounder bases.
- C. Operating and Maintenance Instruction Manual tailored to the new work of this project, including:
 - 1. Operational description.
 - 2. Coded cabling plan.
 - 3. Two wire circuit diagrams.
 - 4. Wiring destination schedule.
 - 5. Schematic component diagrams and PC board layouts.
 - 6. Maintenance and alignment procedures.
 - 7. Voltage drop and battery calculations.

1.4 SYSTEM DESCRIPTION

- A. Provide new equipment that is listed by Underwriters Laboratories and the California State Fire Marshal, designed to meet the functional requirements of NFPA 72.
- B. Provide the following products:
 - 1. Addressable remote power supply.
 - 2. Addressable combination CO detector.
 - 3. Sounder base for CO detector.

1.5 SYSTEM OPERATION

- A. System to be the active interrogate/respond type alarm system, 24 volt DC noncoded, positive, non-interfering, successive operation, in which all devices are constantly sending status signals to the main fire control command center from remote data transmitter panels approximately every one second. A change in status to be reported twice to determine that it is a valid signal and be automatically and permanently recorded.
- B. Wiring, equipment and devices for alarm initiation, annunciation, and audible signaling to be continuously supervised for opens, shorts or grounds (trouble). Each alarm initiating device circuit to be provided with illuminated and audible annunciation of both trouble and alarm conditions. Non-illumination indicates a normal condition.
- C. Any alarm or trouble condition shall sound an audible signal at the fire command center and the remote annunciator. Signal shall be silenced by a momentary contact switch which shall transfer the signal to a visual indicator. Subsequent trouble conditions shall cause the signal to resound and in turn may be silenced. Upon restoration to normal, the trouble signal silencing indicator shall extinguish automatically.
- D. Activation of any automatic or manual alarm initiating device shall cause the following to occur:
 - 1. Sound an audible alarm and illuminate the visual indicator for zone and type of alarm at the fire command center, the remote annunciator and fire alarm control panel.
 - 2. Sound, at building of origin, the audible alarm signal over the system audible devices and activate the visual signal devices.
- E. Detection shall be addressable and reporting of fire conditions to be accomplished by the following basic methods:

1. Manual stations.
 2. Smoke detectors.
 3. Heat detectors.
 4. Duct detectors.
 5. Waterflow switches.
- F. Fire alarm system inputs to be further subdivided as follows, for a more defined indication of the location and nature of the fire or trouble condition:
1. Manual station by device and location.
 2. Smoke/heat detector by device and location.
 3. Waterflow or pressure switch by device and location.
 4. Sprinkler valve position indication by device and location.
- G. Alarm condition shall override trouble indication. Trouble indication shall reappear after alarm reset.
- H. Selective manual testing of any device point or zone in the system to determine normal, trouble or alarm status.
- I. Operation: All components shall be interconnected in accordance with the manufacturer's instructions to provide a complete and operable system as described.

1.6 WARRANTY

- A. For a period of two years from date of final acceptance, the system shall be under full guarantee for materials and labor at no cost to the Owner. The system shall be under a service contract with a technician authorized by the manufacturer. Replacement parts and labor shall be readily available during normal business hours while the service contract is in effect. A complete system inspection and test shall be performed at five months and again at eleven months after final acceptance. Tests shall include all smoke detector sensitivity settings.
- B. Conform to applicable provisions of the General Requirements.
- C. Service technicians and replacement components for the system shall be available locally from a service representative of the manufacturer who is able to provide evidence of technical training and authorization by the manufacturer.
- D. All component failures shall be remedied to the satisfaction of the Owner.
- E. A continuing service contract shall be offered at time of bid to commence at the expiration of warranty included with the system.

PART 2 PRODUCT

2.1 MATERIALS

- A. Provide fire alarm components that are UL listed for power-limited application. Refer to plan sheets for manufacturer and components.

2.2 COORDINATION

- A. Refer to the electrical drawings and specifications to determine quantities and location of devices and required scope of work and coordinate work with electrical installers. Submit conduit and pathing requirements to electrical installer.

2.3 GENERAL

- A. Comply with all applicable paragraphs in Section 26 05 00: Common Work Results for Electrical, apply as though repeated herein
- B. Install system(s) in accordance with manufacturer's instructions.
- C. Include services of certified technicians to supervise installation, provide adjustments, provide final connections, system testing and system training to Owner Representative

2.4 GROUNDING

- A. All equipment to be grounded by means of green ground wire to "U" contact of duplex receptacles and bonded to ground provided under Section 26 05 26: Grounding and Bonding of Electrical Systems.

2.5 INSPECTION

- A. Systems to meet all the requirements of the California Fire Code and shall be approved before installation and prior to final acceptance.

2.6 LOCATION

- A. Before installation, verify exact location of control equipment and outlets. The Owner reserves the right to relocate system components within a radius of 10' at no increase in cost before rough-in work is started for the respective component.

2.7 WIRING

- A. Furnish conductors, equipment, terminal strips, etc., and labor to install a complete and operable system. Cable conductors shall be color coded and numbered for identification at all terminals. Green shall be for grounding conductor only. Use red insulation and or red jacketing on fire alarm cable.

2.8 TESTING

- A. After all equipment specified herein for each system has been installed and is in operating condition, conduct performance tests to determine if the installation and components comply with these specifications. Furnish competent personnel, all test material and approved test instruments and conduct the tests under supervision of factory personnel, in the presence of the Engineer, the building and fire inspecting agencies:
 - 1. The contractor's job foreman, in the presence of a representative of the manufacturer, a representative of the owner, and the fire department shall operate every installed device to verify proper operation and correct annunciation at the control panel.
 - 2. At least on half of all tests shall be performed on battery standby power.
 - 3. Where application of heat would destroy any detector, it may be manually activated.
 - 4. The signaling line circuits and notification appliance circuits shall be opened in at least two (2) locations to verify the presence of supervision.
 - 5. When the testing has been completed to the satisfaction of the contractor representative IOR, representatives of the manufacturer and owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the authority having jurisdiction.
 - 6. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within two years from the date of final acceptance

- by the awarding authority.
7. The local responding fire department must be notified prior to the final test in accordance with local requirements and when requested, participate in system testing and evaluation.

2.9 REPORT

- A. Prepare written report of final test results, signed by witnessing parties. Submit to the Engineer in triplicate for final approval.

END OF SECTION 28 46 00

SECTION 31 11 00 SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY:

- A. This Section includes the following:
 - 1. Provide all material, labor, equipment and services necessary to completely clear and demolish all materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.
- B. RELATED SECTIONS:
 - 1. Contract General Conditions and General Requirements
 - 2. Section 312000 – Earthwork: Excavation, Filling, and Grading
 - 3. Section 312222 – Soil Materials
 - 4. Section 312333 – Trench Excavation and Backfill

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. In accordance with Specification Section GENERAL REQUIREMENTS, and the following:
 - a. Materials and equipment used for this project shall comply with the current applicable regulations of the California Air Resources Board [CARB] and the Environmental Protection Agency [EPA].
- B. Meetings:
 - 1. Minimum agenda shall be to discuss coordination of upcoming work, review the work progress, discuss field observations, identification of any potential problems which may impede planned progress; corrective measures to regain projected schedule; and maintenance of quality and work standards.
 - 2. Meetings shall include Pre-Clearing and Demolition Meetings.
 - 3. Participants (or designated representative of) invited to attend each of the above meetings shall be as follows:
 - a. Contractor.
 - b. Owner.
 - c. Architect.
 - d. Testing Laboratory.
 - e. Local Governing Authorities as applicable.
 - f. Utility Representatives as applicable.
 - g. Owner's Inspector.
 - h. Clearing and Demolition Subcontractor.
 - i. Other subcontractors, as appropriate (including any accessory subcontractors).

1.4 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Dust Control

1. Contractor shall comply with all requirements of the San Joaquin Valley Air Pollution Control District (SJVAPCD) for construction activity related to this project.
 2. A Dust Control Plan, as required by the SJVAPCD, may be required for this project. Contractor shall be responsible for preparing said Dust Control Plan, submitting to the SJVAPCD for review and approval, and paying all SJVAPCD review and permitting fees related to the Dust Control Plan.
 3. No construction activity related to this project may begin until Contractor has secured an approved Dust Control Plan, if one is required.
 4. Contractor shall be solely responsible to implement all requirements of the Dust Control Plan throughout the life of this contract.
 5. Should fines or fees be levied against the Project for violations of the Dust Control Plan and/or related SJVAPCD regulations, Contractor shall be responsible to pay all said fines or fees and to implement all mitigation measures required by SJVAPCD in order to bring the construction activity into compliance with SJVAPCD regulations. The costs for any such fines or fees shall be included in the lump sum price bid for work under this contract and no additional payment will be made therefor.
- B. Existing Conditions:
1. Examine site and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.
 2. Conduct work so as not to interfere unnecessarily with adjacent roads, streets, drives, walks or occupied facilities.
 - a. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and Authorities having jurisdiction.
 - b. Provide alternate routes around closed or obstructed traffic ways if required by Authorities having jurisdiction.
 3. Locate and identify utilities.
 - a. Call a Local Utility Locator Service (USA – “Underground Service Alert” – [800] 227-2600) for the task of locating any applicable utilities in the area where the Project is located.
 4. Carefully remove items indicated to be salvaged and store on Owner’s premises at the Owner’s direction.

PART 2 - PRODUCTS

(NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordination:
1. Coordinate work under this specification section with work specified under other sections to ensure proper and adequate interface of work.
- B. Protection:
1. Protect and maintain all benchmarks and survey control points from disturbance during clearing and demolition operations.
 2. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties.
 3. Furnish and install temporary protection/barrier fencing surrounding the limits of demolition.

4. Protect trees, plant growth, and features not specifically designated for removal. Locate and clearly flag trees and vegetation to remain or to be relocated.
5. Protect existing improvements designated to remain from damage during construction.
 - a. Restore damaged improvements to their original condition, as acceptable to the Owner.

3.2 CONSTRUCTION

- A. Shrub and Weed Removal:
 1. Remove weeds and rooted topsoil to a minimum four (4) inch depth and temporarily stockpile as needed for re-use in finished grading of landscape areas. Remove excess material from the site.
 2. Where existing vegetation is to be replaced by new materials, remove contaminated or excess soil from the site and legally dispose of off-site.
- B. Existing Site Improvements Removal:
 1. Remove existing above and below grade improvements as necessary to facilitate new construction.
 - a. Remove concrete slabs, sidewalk, curbs, mow strips, gutters, and fence post footings.
 - 1) Neatly saw-cut length of existing pavement to remain before removing existing pavement unless existing full-depth joints coincide with line of demolition. Saw-cut faces vertically.
 - b. Remove indicated utility improvements within the limits of construction.
 - 1) Excavate for and disconnect utilities designated to be removed. Seal or cap off underground.
 - 2) Coordinate removal and/or relocation of utilities with the appropriate utility agencies.
 - c. Where existing underground utilities, irrigation pipes, wells, leach fields, or underground tanks are encountered, they must be removed or moved to a point at least 5 feet horizontally outside the proposed building and 3 feet horizontally outside the concrete flatwork or pavement construction areas. All resultant cavities must be backfilled with engineered fill.
- C. Existing Utilities to Remain or be Relocated:
 1. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - a. Notify Architect and the Owner not less than seven (7) days in advance of proposed utility interruptions.
 - b. Arrange to shut off indicated utilities with utility companies and Owner.
- D. Disposal:
 1. Legally dispose of all debris (surplus soil materials, unsuitable topsoil, obstructions, demolished materials, waste materials, trash, etc.) resulting from clearing, grubbing, demolition and from construction. Disposal of all materials shall be at a location secured by the Contractor off of the Owner's property.

END OF SECTION 31 11 00

SECTION 31 20 00 EARTHWORK: EXCAVATION, FILLING AND GRADING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY:

- A. This Section includes the following:
1. Excavating soil and other material for surface improvements.
 2. Placing fill.
 3. Compaction of existing ground and fill.
 4. Preparation of subgrade for other improvements.
 5. Grading of soil.

B. **RELATED SECTIONS**

1. Contract General Conditions and General Requirements
2. Section 311100 – Site Clearing
3. Section 312222 – Soil Materials
4. Section 312333 – Trench Excavation and Backfill

1.3 REFERENCES

- A. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18-inch (457 mm) Drop.

1.4 DEFINITIONS

- A. **Utility:** Any buried or above ground pipe, conduit, cable, associate device or appurtenances, or substructure pertaining thereto.

1.5 SUBMITTALS

- A. **Product Data:**
1. Information indicating the source of all import material, the fill material type and where it is to be used, and approval of the District's Inspector of Record for incorporation of import material into the Work.
- B. **Material Test Reports:**
1. Classification of Soils.
 2. Compaction Characteristics of Soils.
 3. Density and Unit Weight of Soils in Place.
 4. Imported fill shall be tested and approved by the Owner's Geotechnical Engineer prior to import to the site, including testing for compliance with Department of Toxic Substances Control (DTSC) guidelines. Said testing and certification documents shall be paid for by the Owner.
- C. **Project Closeout:** In accordance with Specification Section PROJECT CLOSEOUT.

1. Drawings indicating the extent and depth of all engineered fill, and overexcavation and recompaction. This information shall be a part of the Project “As-Built” and Project “Record” Documents in accordance with the Specification Section PROJECT DOCUMENTS.

1.6 QUALITY ASSURANCE

- A. Installer:
 1. Qualifications:
 - a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this project within the past 5 years.
- B. Regulatory Requirements:
 1. In accordance with Specification Section REGULATORY REQUIREMENTS and the following:
 - a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board [CARB].
 - b. CLB City of Los Banos, Codes and Ordinances
 - c. EPA Environmental Protection Agency.
 - d. CAL/OSHA Comply with all provisions of the Construction Safety Orders and the General Safety Orders of the California Division of Occupational Safety and Health, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground excavations.
 - e. DTSC Comply with all recommendations of the California Department of Toxic Substance Control (DTSC) regarding soil testing for potential contaminants.
- C. Certificates:
 1. Installer’s certification that all Earthwork installation meets or exceeds the requirements of this specification.
 2. Contractor’s certification (on Contractor’s letterhead paper) that the Earthwork materials and installation meets or exceeds the requirements of this specification.
- D. Meetings:
 1. Pre-Installation: Schedule prior to the start of work.
 - a. Coordinate the work with other work being performed.
 - b. Identify any potential problems, which may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.
 2. Progress: Scheduled by the Contractor during the performance of the work.
 - a. Review for proper installation of work progress.
 - b. Identify any installation problems and acceptable corrective measures.
 - c. Identify any measures to maintain or regain project schedule if necessary.
 3. Completion: Scheduled by the Contractor upon proper completion of the work.
 - a. Inspect and identify any problems which may impede issuance of warranties or guaranties.
 - b. Maintain installed work until the Notice of Substantial Completion has been filed.

1.7 COORDINATION

- A. Coordinate work with Owner’s personnel.

- B. Provide required notification to the Owner and Geotechnical Engineer or the Engineer of Record so that a representative from the Owner's Geotechnical Engineering consultant can be present for all excavation, filling and grading operations to test and observe earthwork construction.
- C. Verify that the location of existing utilities has been indicated at work site by utility authorities, by Owner, and as specified on the Plans.

1.8 EXISTING CONDITIONS

- A. Existing Conditions:
 - 1. Examine the site and verify conditions with the Drawings and Specifications. Contractor shall familiarize himself with existing site conditions and any changes that have occurred at the site since the preparation of the contract documents and shall be responsible to account for any such changes in the price bid for this work.
 - 2. Thoroughly investigate and verify conditions under which the Work is to be performed.
 - 3. Locate and identify utilities:
 - a. Call a Local Utility Locator Service (USA - "Underground Service Alert" – [800] 227-2600) for the task of locating any applicable off-site and on-site utilities in the area where the Project is located.
 - 4. No allowance for Extra Work will be granted resulting from negligence or failure to meet requirements of this Section.
- B. Where subsurface work involves more than the normal depth of excavation required for the removal and/or construction of surface improvements (surface improvements such as concrete flatwork, paving, landscaping, signs, etc.), the Engineer will have made a diligent attempt to indicate on the plans the location of all main and trunk line utility facilities which may affect the Work. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- C. Under similar circumstance, service laterals and appurtenances will have also been shown where information was available as to their location. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- D. Determine exact location of existing buried utilities by:
 - 1. Marking on ground or pavement surface the alignment and extent of the facilities and the probable location of existing utilities using construction plans and existing surface features.
 - 2. Requesting Underground Service Alert (USA) to indicate location of existing buried facilities (phone 1-800-227-2600). Provide USA a minimum of two (2) working days notice of request for locations and notify Owner of said request concurrently.
 - 3. Confirm exact location of existing utilities by hand methods of excavation, or by use of vacuum equipment.
- E. At proposed work location, expose by hand methods (or vacuum equipment) all existing utilities along the route of the proposed work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand (or vacuum equipment) methods to locate all existing facilities as indicated on the plans, and/or as indicated on the ground by USA or Owner's personnel.
- F. Provide Field Engineering to record the location of all utilities encountered. Where locational conflicts exist between existing utilities and the planned location of facilities to be constructed under this Contract, submit detailed information to the Engineer for review and direction.

- G. Maintain all existing utility mains and service lines in constant service during construction of the Work.
- H. Where service disruptions are allowed, minimize the length of such disruptions by proper scheduling and diligent pursuit of the work, and coordinate the timing of any such disruptions in advance with the District.
- I. Existing soils are considered to have a highly corrosive potential to buried metal objects.
- J. Existing soils are considered to have a low expansion potential.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Dust control: Perform work in a manner as to minimize the spread of dust and flying particles. Thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors and concurrent performance of other on-site work.
 - 1. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.
 - 2. All land clearing, demolition, grubbing, scraping, excavation, land leveling, grading, and cut and fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by pre-soaking.
 - 3. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions or at least six inches of freeboard space from the top of the container shall be maintained.
 - 4. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. The use of blower devices is expressly forbidden.
 - 5. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/ suppressant.
 - a. Contractor shall comply with all requirements of the San Joaquin Valley Air Pollution Control District (SJVAPCD) for construction activity related to this project.
 - b. A Dust Control Plan, as required by the SJVAPCD, may be required for this project. If required, Contractor shall be responsible for preparing said Dust Control Plan, submitting to the SJVAPCD for review and approval, and paying all SJVAPCD review and permitting fees related to the Dust Control Plan.
 - c. If a dust control plan is required, no construction activity related to this project may begin until Contractor has secured an approved Dust Control Plan.
 - d. Contractor shall be solely responsible to implement all requirements of the Dust Control Plan throughout the life of this contract.
 - e. Should fines or fees be levied against the Project for violations of the Dust Control Plan and/or related SJVAPCD regulations, Contractor shall be responsible to pay all said fines or fees and to implement all mitigation measures required by SJVAPCD in order to bring the construction activity into compliance with SJVAPCD regulations. The costs for any such fines or fees shall be included in the lump sum price bid for work under this contract and no additional payment will be made therefore
- B. Burning: No burning will be allowed on-site.
- C. Rain: Work under this section shall not be started or maintained under threat of rain, unless the work is not affected by the rain.

- D. Do not place fill during weather conditions which will alter moisture content of fill materials sufficiently to make compaction to the specified densities difficult or impossible.
- E. When reference is made to SWPPP (Storm Water Pollution Prevention Plan), if any within this Project Manual, then comply with all environmental protection requirements included therein.
- F. In accordance with EPA, CARB and CLB.
- G. Protection:
 - 1. Protect cut and fill areas to prevent water running into excavation. Maintain areas free of water. Remove seeping water immediately by pumps. Provide dewatering as necessary.
 - 2. Protect cut slopes from erosion due to precipitation and other sources of runoff.
 - 3. Protect utilities to remain within the construction area and special construction. If utility lines are uncovered (water, electric, sewer, etc.) not shown on the drawings during excavation of site, notify the Architect promptly for its review and action.
 - 4. Do not permit access to undeveloped portions of the site, nor to areas that are outside of the limits of grading.
- H. Before being brought onto the site, all import soil must be sampled, tested and approved by Owner's Geotechnical Engineer. All import material must comply with DTSC recommendations and guidelines for environmentally clean soil suitable for school construction. Import testing will be provided and paid for by the Owner.

1.10 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of GENERAL CONDITIONS and DIVISION 1, GENERAL REQUIREMENTS.
- B. Accurately record actual locations of utilities encountered including depth and horizontal location, as measured from permanent site features.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fill in Turf or Other Planting Areas: Type S2 or S3 per Division 31 Specification Section SOIL MATERIALS.
- B. Fill in Non-planting Areas: Type S1, S2 or S4 per Division 31 Specification Section SOIL MATERIALS.
- C. Imported material: Type S3, S4 or S5 per Division 31 Specification Section SOIL MATERIALS.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site conditions.

3.2 PREPARATION

- A. Layout of Work:
 - 1. Contractor shall be responsible for all lines and grades. Layout shall be provided by a California registered Land Surveyor or Civil Engineer, at Contractor's expense.

2. Check all benchmarks, monuments and property lines and verify locations.
 3. Locate and maintain all grade stakes.
 4. Monuments moved or displaced during grading operation are to be replaced by a California Registered Civil Engineer or Surveyor, at Contractor's expense.
- B. Locate, identify, and protect existing above and below grade utilities from damage.
 - C. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.
 - D. Protect existing structures, fences, curbs, sidewalks, paving and other improvements to remain from damage from excavation equipment and vehicular traffic.
 - E. Employ equipment and methods appropriate to the work site.
 - F. Protect excavated areas from drainage inflow and provide for drainage of all excavated areas.
 - G. Comply with all provisions of the Construction Safety Orders and General Safety Orders of the California Division of Industrial Safety, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground in excavations.

3.3 SITE STRIPPING:

- A. Reference is made to Division 31 Specification Section SITE CLEARING.
- B. Within the areas of planned surface improvements and structures, the near surface soils containing vegetation, roots, organics, or other objectionable material must be stripped and removed from the site. Upon approval of the Geotechnical Engineer, suitable materials stripped from the site may stockpiled and incorporated into the finish fill for planting areas.
- C. All areas to receive surface improvements shall be stripped to remove turf, shrubs, trees and other vegetation, along with associated root systems, concrete, wood, metal, rubbish and other unsuitable debris, and any loose, saturated or unconsolidated soil material. Minimum stripping depth is expected to be 4-inches below existing site grades. Stripping shall continue to the depth required to expose acceptable basement soils that are free from deleterious which are not suitable for Engineered Fill, as required by the Geotechnical Engineer.

3.4 EXCAVATION

- A. Following clearing and stripping operations, excavate planned construction areas as specified in this Section.
- B. Within the area of the planned building improvements plus at least 5 feet horizontally beyond the perimeter of these improvements, the subgrade must be over-excavated at least 12 inches below the stripped subgrade surface or at least to the bottom of footings, whichever is lower.
- C. Areas of exterior concrete slabs on grade located outside the building pad over-excavation limits, should be prepared by scarification of the upper 12-inches below existing grade or 12-inches below the bottom of the recommended aggregate base section, whichever is greater. The zone of subgrade preparation should extend a minimum of 3 feet beyond these improvements. These soils should be moisture conditioned to slightly above optimum and compacted as engineered fill.
- D. Areas of asphalt concrete improvements should be prepared by scarification of the upper 12-inches below existing grade or 12-inches below the recommended base section, whichever is

greater. These soils should be moisture conditioned to slightly above optimum and compacted as engineered fill.

- E. Provide additional excavation as required to conform to the lines, grades and cross-sections shown on the plans.
- F. When excavating through tree roots, perform work by hand and cut roots, where authorized, with a saw. Remove all roots ¼" in diameter and greater.
- G. Remove excess soil not to be used as fill in the Work from the site. Unless requested by Owner to be deposited at a site designated by Owner on the property, obtain a disposal site and legally dispose of said excess material, all at no additional cost to the Owner.
- H. Areas disturbed by demolition must be excavated to expose undisturbed soils.
- I. Excavated soils free of deleterious substances (organic matter, demolition debris, tree roots, etc.) and with less than 3% organic content by weight, may be returned to the excavations as Engineered Fill.

3.5 FILLING AND COMPACTING

- A. Once clearing, stripping and over-excavation operations are complete, scarify the surface to receive fill material or improvements to a depth of 8-inches, moisture condition to at least 2% above optimum moisture content, and compact to a minimum of 90% of maximum dry density (relative compaction) based on ASTM Test Method 1557.
- B. Place and compact soil to finish subgrade of improvements to be placed thereon, or to finished surface grade where no improvements are to be placed thereon.
- C. All fill required shall be placed as Engineered Fill.
- D. The Contractor shall be solely responsible for securing an acceptable source of import material as required to grade the site. Reference is made to 31 20 00 1.9.H
- E. On-site soils are suitable for re-use as Engineered Fill, providing they are cleansed of excessive organics (less than 3 percent by weight, ASTM D2974), debris, and fragments larger than three (3) inches in maximum dimension and meet the requirements of soil Type S4, Division 31 Specification Section SOIL MATERIALS.
- F. Engineered Fill shall be moisture conditioned to within 2% of optimum moisture, placed in uncompacted layers not exceeding eight (8) inches in thickness, and compacted as specified, based on ASTM Test Method D1557.
 - 1. Non-vegetative surface improvement areas (structures and site concrete improvements) - To a minimum of 92% of maximum dry density (relative compaction).
 - 2. Vegetative surface improvement areas (turf and planters) - Below top twelve (12) inches - to a minimum of 90% of maximum dry density (relative compaction). Top twelve (12) inches - 85% of maximum dry density (relative compaction).
 - 3. Pavement areas: to a minimum 95% of maximum dry density (relative compaction) in top twelve (12) inches.
- G. Maintain optimum moisture content of fill materials to attain required compaction density.
- H. Additional lifts shall not be placed if the previous lift did not meet the required dry density (relative compaction), or if soil conditions are not stable.

- I. Conform fill to the lines, grades and cross-sections shown on the plans.
- J. Fill materials to conform to Division 31 Specification Section SOIL MATERIALS.
- K. Provide, at no additional cost to Owner, imported soil material conforming to the requirements of Division 31 Specification Section SOIL MATERIALS, as needed to attain finished grades of Work.
- L. Utilize equipment which will not disturb or damage existing utilities and other improvements.

3.6 PREPARATION OF SUBGRADE FOR SURFACE IMPROVEMENTS

- A. Where concrete, asphalt-concrete, aggregate base, or other non-vegetative surface improvements, or a layer of said surface improvements, are to be constructed on the soil surface, prepare the subgrade for said improvements in accordance with this section.
- B. Scarify the soil as specified and remove and dispose of (off the project site) all rocks, hardpan chunks or otherwise unsuitable material over 3-inches in size.
- C. Thoroughly moisture condition and compact as described above.
- D. Prior to commencing construction of surface improvements, pass a test roller of size and weight as approved by the Owner over the subgrade to establish the extent of soft or spongy areas requiring repairs.
- E. Conform finished subgrade surface to the lines, grades and cross-sections shown on the plans.

3.7 FINE GRADING

- A. Fine grade all finished surfaces to the lines, grades and cross-sections shown on the plans, and to blend to hard surface improvements.
- B. Rake and smooth all finished surfaces not to receive hard surface improvements.
- C. Use suitable stockpiled or imported topsoil for the top 12-inches of areas to receive landscape improvements.
- D. Import topsoil meeting the requirements of Division 31 Specification Section SOIL MATERIALS, as required to complete finish grading.
- E. Topsoil may not be used in areas requiring Engineered Fill.

3.8 TOLERANCES

- A. Top surface of Subgrade for Non-Vegetative Surface Improvements or Layers thereof: Plus or minus 0.02 foot from planned elevation.
- B. Top surface of Subgrade for Vegetative Surface Improvements or for Bare Ground - Plus or minus 0.05 foot of planned elevation, or as required for finish surface to match adjacent improvements or ground.

3.9 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of GENERAL CONDITIONS and/or DIVISION 1, GENERAL REQUIREMENTS.

- B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.
- C. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest.
- D. All retesting required as a result of failure of initial test will be performed by Owner's testing agency, at the expense of the Contractor.

3.10 PROTECTION

- A. Protect graded areas from traffic, freezing, erosion, and all other sources of damage. Keep free of debris and trash.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed work becomes eroded, rutted, settled, or where it is damaged by subsequent construction operations or weather.
- C. Where settlement occurs prior to acceptance of the work, remove and replace surface improvements, excavate, replace, and re-compact in accordance with these specifications, and restore the surface improvements.

3.11 CLEANING

- A. Remove all surplus or unsatisfactory soil material, trash, and debris, and legally dispose of off of the Owner's property.

END OF SECTION 31 20 00

SECTION 31 22 22 SOIL MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions Sections, apply to this Section.

1.2 SUMMARY:

- A. SECTION INCLUDES
 - 1. Excavated (and re-used) materials and imported materials.

1.3 RELATED SECTIONS:

- A. Section 312000 - Earthwork: Excavation, Filling and Grading.
- B. Section 312333 - Trench Excavation and Backfill.

1.4 SUBMITTALS

- A. Samples: Submit, in air-tight containers, 10 lb. sample of Type S3, S4 and S5 fill to inspector.
- B. Soil Analysis: Submit for Type S3, S4 and S5 soils to be imported.
- C. Materials Source: Submit location of imported materials source. Provide materials from same source throughout the work. Change of source requires approval.
- D. For imported soil, obtain Geotechnical Engineer and District approval prior to importing.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Soil Type S1: Excavated and re-used material, graded; free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
- B. Soil Type S2: Excavated and reused material, graded; free of roots, lumps greater than one inch, rocks larger than 1/2 inch, debris, weeds and foreign matter.
- C. Soil Type S3: Imported topsoil, friable loam; reasonably free of roots, rocks larger than 1/2 inch, debris, weeds, and foreign matter.
- D. Soil Type S4: Imported borrow, suitable for purposes intended, meeting the following characteristics:
 - 1. Maximum Particle Size: 3"
 - 2. Percent Passing #4 Sieve: 65-100
 - 3. Percent Passing #200 Sieve: 20-45
 - 4. Expansion Index: <20
 - 5. Plasticity Index: <12
 - 6. R-Value (in paved areas): >50
 - 7. Low Corrosion Potential:
 - a. Soluble Sulfates: <1,500 mg/Kg

- b. Soluble Chlorides: <300 mg/Kg
- c. Soil Resistivity: >5,000 ohm-cm

- E. Soil Type S5: Imported sand. Natural river or bank sand (sand equivalent greater than 30), washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

2.2 SOURCE QUALITY CONTROL

- A. Inspection of imported soil will be performed by the Geotechnical Engineer, at source of import and prior to being delivered to the site.

PART 3 - EXECUTION

3.1 STOCKPILING

- A. Stockpile excavated or imported material onsite at location designated by project inspector.
- B. Stockpile excavated or imported material in sufficient quantities to meet project schedule and requirements.

3.2 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.
- B. Dispose of excess material off-site.

END OF SECTION 31 22 22

SECTION 31 23 33 TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY:

- A. SECTION INCLUDES
 1. Excavating trenches, holes and pits for constructing the Work.
 2. Backfill and compaction.
 3. Providing suitable bedding and backfill material, as specified herein.
- B. RELATED SECTIONS
 1. Contract General Conditions and General Requirements.
 2. Section 311100 - Site Clearing
 3. Section 312000 - Earthwork: Excavation, Filling and Grading
 4. Section 312222 - Soil Materials
 5. Section 331200 - Water Utilities
 6. Section 333000 - Site Sewer Systems
 7. Section 334000 - Storm Drainage

1.3 REFERENCES

- A. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

1.4 DEFINITIONS

- A. Utility: Any buried or above ground pipe, conduit, cable, associate devices or appurtenances, or substructure pertaining hereto.

1.5 QUALITY ASSURANCE

- A. Qualifications
 1. Installer:
 - a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this project within the past 5 years.
- B. Regulatory Requirements:
 1. In accordance with Specification Section REGULATORY REQUIREMENTS and the following:
 - a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board [CARB].
 - b. EPA Environmental Protection Agency.
 - c. CAL/OSHA Comply with all provisions of the Construction Safety Orders and the General Safety Orders of the California Division of Occupational Safety and Health, as well as all other applicable

regulations as they pertain to the protection of workers from the hazard of caving ground excavations.

- C. Certificates:
 - 1. Installer's certification that all trench backfill installation meets or exceeds the requirements of this specification.
 - 2. Contractor's certification (on Contractor's letterhead paper) that the trench backfill materials and installation meets or exceeds the requirements of this specification.

- D. Meetings:
 - 1. Pre-Installation: Schedule prior to the start of work.
 - a. Coordinate the work with other work being performed.
 - b. Identify any potential problems, which may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.
 - 2. Progress: Scheduled by the Contractor during the performance of the work.
 - a. Review for proper installation of work progress.
 - b. Identify any installation problems and acceptable corrective measures.
 - c. Identify any measures to maintain or regain project schedule if necessary.
 - 3. Completion: Scheduled by the Contractor upon proper completion of the work.
 - a. Inspect and identify any problems which may impede issuance of warranties or guaranties.
 - 4. Maintain installed work until the Notice of Substantial Completion has been filed.

1.6 COORDINATION

- A. Coordinate work with Owner's personnel.
- B. Verify that the location of existing utilities have been indicated at work site by utility authorities.

1.7 EXISTING UTILITIES

- A. Where subsurface work involves more than the normal depth of excavation required for the removal and/or construction of surface improvements (surface improvements such as concrete work, paving, landscaping, signs, etc.), the Engineer will have made a diligent attempt to indicate on the plans the location of all main and trunkline utility facilities which may affect the Work. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- B. Under circumstance similar to 31 23 33/1.7A, service laterals and appurtenances will have also been shown where information was available as to their location. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- C. Determine exact location of existing buried utilities by:
 - 1. Marking on ground or pavement surface the alignment and extent of the proposed facilities and the probable location of existing utilities using construction plans and existing surface features.
 - 2. Requesting Underground Service Alert (USA) to indicate location of existing buried facilities (phone 1-800-227-2600). Provide USA a minimum of two (2) working days notice of request for locations, and notify Owner of said request concurrently.
 - 3. Locate exact location of existing utilities by hand methods of excavation, or by use of vacuum equipment.

- D. At proposed work location, expose by hand methods (or vacuum equipment) all existing utilities along the route of the proposed work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand (or vacuum equipment) methods to locate all existing facilities as indicated on the plans, and/or as indicated on the ground by USA or Owner's personnel.
- E. Provide Field Engineering per Contract General Conditions and Division 1 to record the location of all utilities encountered. Where locational conflicts exist between existing utilities and the planned location of facilities to be constructed under the Contract, submit detailed information to the Owner's Inspector and Engineer for review and direction.
- F. Maintain all existing utility mains and service lines in constant service during construction of the Work.
- G. Where service disruptions are allowed, minimize the length of such disruptions by proper scheduling and diligent pursuit of the work.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. Fill Type S1, S2, S4 and S5, as specified in Division 31 Specification Section SOIL MATERIALS.

2.2 WARNING TAPE

- A. 6" wide warning tape shall be installed over all of the pipelines as shown on the details.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.
- B. Protect existing structures, fences, sidewalks, curbs, and other improvements from excavation equipment and vehicular traffic.
- C. Maintain and protect above and below grade utilities which are to remain.
- D. Comply with all provisions of the Construction Safety Orders and General Safety Orders of the California Division of Industrial Safety, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground in excavations.

3.2 EXCAVATION

- A. Excavate soil required to locate existing utilities and install the work.
- B. Use hand methods of excavation to locate existing utilities, and to excavate trenches, pits and holes in congested areas.
- C. Employ equipment and methods appropriate to the work site. Small mechanical excavators may be used only in areas where there is sufficient space so as not to damage adjacent improvements, and where the locations of all existing utilities have been determined by hand

methods of excavating.

- D. Cut trenches just wide enough to enable installation and proper bedding and backfill, and to allow inspection.
- E. Do not interfere with 45 degree (1:1) bearing splay of foundations.
- F. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose material.
- G. Excavate trenches, pits or holes bottoming in hardpan to a minimum of 6 inches below the grade for the bottom of the pipe and any couplings, and then backfill to the pipe grade with Type S2 or S5 material, containing sufficient moisture to allow compaction to 90% maximum dry density (relative compaction). Soil Type S2 shall meet requirements of Type S5. No additional payment will be made for such over-excavation and refill.
- H. In all trenches or excavation sites where a firm foundation is not encountered, such as soft, spongy, or otherwise unsuitable material, remove the material to a minimum of 12 inches, or to a depth determined by the Engineer, below the bottom of the proposed pipe or structure, and backfill the space with Type S2 or S5 material containing sufficient moisture to allow compaction to 90% maximum dry density (relative compaction). Soil Type S2 shall meet requirements of Type S5. No additional payment will be made for such additional excavation or backfill.
- I. Excavate trenches to provide the design grade of the facility, or as directed by the Engineer.
- J. Stockpile excavated material to be returned to trench adjacent thereto in location which will not be detrimental to existing improvements, or pedestrian or vehicular traffic. Remove from site all unsuitable or excess material not to be used.
- K. When excavating through tree roots, perform work by hand and cut roots, where authorized, with a saw.
- L. Remove excess soil not used as backfill from the work site. Obtain a disposal site off of the Owner's property and legally dispose of said excess material, all at no additional cost to the Owner.
- M. If water is encountered during excavations, provide all dewatering measures necessary to construct improvements shown.
- N. Contractor shall make all provisions necessary, including but not limited to, shoring or sloping back trench walls as required to address sandy soils. The cost of these provisions shall be included in the lump sum amount bid for this work and no separate payment will be made therefore.

3.3 PROTECTION OF EXCAVATIONS

- A. Provide all shoring and bracing as required and those codified in local, state and federal safety regulations.
- B. Prevent water, caving or sloughing ground from entering excavations.
- C. Maintain excavations free of water.

3.4 BACKFILLING

- A. Provide type S2 or S5 pipe bedding as required by Plans and compact to 90% maximum dry

density (relative compaction). Soil Type S2 shall meet requirements of Type S5.

- B. After installation of pipes and appurtenances and placement of pipe bedding material, backfill trenches and excavations to finished grade, or subgrade in areas to receive surface improvements
- C. Backfill trenches above pipe bedding material and to within 24 inches of finish subgrade with Type S1, S2, S4, or S5 soils, except that that top 12 inches shall be type S2, S3, S4, or S5 soils.
- D. Employ a placement method that does not disturb or damage existing or proposed pipes or other Utilities or Improvements.
- E. Place and compact all soil backfill in continuous layers not exceeding 8 inches in loose uncompacted thickness, moisture condition to at least 3% above optimum moisture content.
- F. Maintain optimum moisture content of fill materials to attain required compaction.
- G. Backfill final 12-inch thickness to finish subgrade in areas to receive concrete, asphalt-concrete, aggregate base, or other non-vegetative surface improvement, with Type S2, S4, or S5 soils.
- H. Backfill final 12-inch thickness to finish subgrade in areas to receive sod, other vegetation, or bare soil, with Type S2 or S3 soils.
- I. Compact backfill below the top 12-inches to 90% maximum dry density (relative compaction).
- J. In areas to receive buildings, structures, or concrete flatwork, compact the top 12-inches to 90% maximum dry density (relative compaction).
- K. In areas to receive asphalt concrete pavement or concrete pavement subject to vehicular traffic, compact the top 12-inches to 95% maximum dry density (relative compaction).
- L. In planting areas, compact the top 12-inches to 85% maximum dry density (relative compaction).

3.5 TOLERANCES

- A. Top Surface of Backfill under Paved or Concrete Areas: Plus or minus 0.02 feet from required elevations.
- B. Top Surface of General Backfilling: As required for finish surface to match adjacent improvements or ground.

3.6 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of General Conditions and/or Division 1.
- B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.
- C. If tests indicate work does not meet specified requirements, recompact, and retest. Retests required due to failure of initial tests shall be paid for by the Contractor.

3.7 PROGRESS AND PROSECUTION

- A. Backfill any excavation opened in any day on that same day.

END OF SECTION 31 23 33

SECTION 32 11 26 AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Provide all material, labor, equipment and services necessary to install aggregate base surfacing as indicated by the Contract Documents.

1.3 RELATED SECTIONS

- A. All Division 00 Specification Sections
- B. District's General Conditions Requirements
- C. Section 312000 – Earthwork: Excavation, Filling, and Grading.
- D. Section 312333 – Trench Excavation and Backfill.
- E. Section 321216 – Soil Sterilization.
- F. Section 321313 – Site Concrete Improvements.

1.4 REFERENCES

- A. SSCDOT - Standard Specifications, Department of Transportation, State of California (Caltrans), latest edition, except for references to method of payment, and references to any state furnished materials

1.5 QUALITY ASSURANCE

- A. Provide and install in accordance with SSCDOT.

1.6 SUBMITTALS

- A. Submit data sheets from supplier to document compliance with SSCDOT requirements.
- B. Certificates of compliance for material.
- C. Load tags for delivered material.

1.7 COORDINATION

- A. Coordinate with other work, including subgrade preparation and soil sterilization.
- B. Coordinate installation schedule with Owner's use of the premises and with other contractors working at the site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregate Base: Unless specified otherwise on Plans, Class 2, 3/4 Inch Maximum per Section

26 of SSCDOT.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify quantities required.
- B. Verify that subgrade has been placed and compacted per Contract Documents
- C. Verify gradients and elevations of subgrade are correct.

3.2 INSTALLATION OF AGGREGATE BASE COURSE

- A. Install in conformance with SSCDOT Section 26, Aggregate Bases.
- B. Thickness - As shown on construction drawings.
- C. Spreading and Compacting - In accordance with Section 26, SSCDOT. Base course shall be moisture conditioned to within 2% of optimum moisture, placed in uncompacted layers not exceeding six (6) inches in thickness, and compacted as specified, based on ASTM Test Method D1557. The relative compaction of each layer of compacted base material shall be not less than 95 percent.
- D. The completed surface shall be thoroughly compacted, free from ruts, depressions, and irregularities, true to grade and cross-section.
- E. Lines and grades for the installation of aggregate base shall be set by a California licensed Land Surveyor or Civil Engineer, at Contractor's expense.

3.3 TOLERANCES

- A. Compacted thickness of aggregate base: Not less than the thickness specified on the Plans.
- B. Finished Surface: Within 0.02 foot of planned grade per Section 26, SSCDOT. No more than 50% of the finish surface shall be above or below the specified grade for aggregate base.

3.4 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed by the Owner's inspector, under provisions of Division 01.

3.5 PROTECTION

- A. Immediately after placement and compaction, protect surface from mechanical injury.
- B. Protect completed surface until surfacing layers are in place.

END OF SECTION 32 11 26

SECTION 32 12 16 SOIL STERILIZATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to the work specified in this section.

1.2 SECTION INCLUDES

- A. Furnish and install soil sterilant under all asphalt paving.

1.3 RELATED SECTIONS

- A. Section 312000 – Earthwork: Excavation, Filling, and Grading
- B. Section 312333 – Trench Excavation and Backfill
- C. Section 321126 – Aggregate Base Course
- D. Drawings and general provisions of Contract, including General and Supplementary Conditions, apply to the work of this section.

1.4 STANDARDS

- A. In accordance with the following:
 - CCR-T21 California Code of Regulations, Title 21 Public Works.
 - CBC California Building Code, California Code of Regulations, Title 24, Part 2, CCR-T24.
 - USDA United States Department of Agriculture.
 - EPA Environmental Protection Agency.
 - All applicable Environmental Regulations and Standards.

1.5 QUALITY ASSURANCE

- A. Provide licensed operator to apply soil sterilant.
- B. All products shall comply with the current EPA laws at time of application. Should the products listed become unavailable because of changes in the law, submit substitute products for review by the Owner.

1.6 SUBMITTALS

- A. Submit in accordance with Specification Section SUBMITTAL PROCEDURES.
- B. Certificates of application.
- C. Certificates of compliance for material.

1.7 COORDINATION

- A. Coordinate with other work, including subgrade preparation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Soil Sterilant: Bayer Oust XP, weed and grass preventer, or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that site is ready for application.

3.2 PREPARATION

- A. Identify installation locations.
- B. Employ equipment and methods appropriate to the work site.

3.3 APPLICATION

- A. Thoroughly water soak surface to be treated. Avoid excessive water runoff.
- B. Apply sterilant solution over surface to receive pavement or surfacing prior to the start of pavement or surfacing installation.
- C. Apply in spray form, at rate as allowable by State of California and the manufacturer's recommended application rate.
- D. Take all precautions to limit soil sterilant solution to areas immediately under proposed pavement or surfacing. Use shields as necessary, and do not apply under windy conditions.

3.4 FIELD QUALITY CONTROL

- A. Field inspection will be performed under Specification Section QUALITY REQUIREMENTS.

END OF SECTION 32 12 16

SECTION 32 13 13 SITE CONCRETE IMPROVEMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY:

- A. This Section includes the following:
 - 1. All material, labor, equipment and services necessary to completely install exterior Portland cement flatwork, cast-in-place concrete, and architectural flatwork concrete, accessories and other related items, slabs, ramps and sidewalks and walkways, curb and gutter, mowstrips, and other miscellaneous concrete items of the form and dimensions shown on the plans and necessary to complete the project, and in accordance with the requirements of the Standard Specifications as modified and supplemented by these Special Provisions
 - 2. Drawings and general provisions of Contract, including General and Supplementary Conditions, apply to the work of this section.
- B. RELATED SECTIONS:
 - 1. Section 312000 - Earthwork: Excavation, Filling, and Grading
 - 2. Section 321126 - Aggregate Base Course.
 - 3. Section 321315 - Concrete Reinforcement

1.3 REFERENCES

- A. SSCDOT - Standard Specifications, Department of Transportation, State of California (Caltrans), latest edition, except for references to method of payment, and references to any state furnished materials.
- B. ACI standards, including but not limited to #304, 305, 306, 308, 309 and 347.
- C. ASTM standards, including but not limited to #C-33, C-39, C-94, C-136, C-143, C-150, and C-309.

1.4 SUBMITTALS

- A. Submit under provisions of Specification Section SUBMITTALS.
 - 1. Certificates of compliance for materials and mix designs.
 - 2. Load tags for delivered material.
 - 3. Strength testing as required by the approving agency.
 - 4. Integral color sample, where applicable.
 - 5. Application instructions for the architectural finish materials.
 - 6. Accessories and manufacturer's installation specifications.

1.5 QUALITY ASSURANCE

- A. Furnish concrete materials conforming with SSCDOT.
- B. Perform work in accordance with SSCDOT, unless noted otherwise herein.

PART 2 - PRODUCTS

2.1 MIXES

- A. Mix Design and Proportions in accordance with SSCDOT:
1. Mix designs with Fly Ash content no greater than 15 percent of the total weight of cementitious materials shall be proportioned by SSCDOT.
 2. Provide a maximum of 4 percent air entrainment, unless noted otherwise.
 3. Owners Testing laboratory shall review all mix designs before submittal.
 4. All concrete shall have the following minimum compressive strengths in accordance with ACI 318 and SSCDOT at 28 days and shall be proportioned within the following limits:
 - a. Site Concrete: Use for exterior concrete slabs on grade including, but not limited to sidewalks, curbs, gutters, mow strips, utility appurtenances and miscellaneous site improvements.
 - 1) Strength: 3,000 psi at 28 days
 - 2) Maximum Aggregate Size: 1-inch
 - 3) Cement Type: Type I/II/IV/V
 - 4) Cement Content: 5.5 sacks/yd minimum
 - 5) Max Water/Cement Ratio: Per SSCDOT
 - 6) Admixture: Per SSCDOT
 - b. Structures & Vehicular Concrete Paving: Use for site structures and exterior slabs on grade subject to vehicle traffic.
 - 1) Strength: 4,000 psi at 28 days
 - 2) Maximum Aggregate Size: 1-inch
 - 3) Cement Type: Type I/II/IV/V
 - 4) Cement Content: 6.5 sacks/yd minimum
 - 5) Max Water/Cement Ratio: Per SSCDOT
 - 6) Admixture: Per SSCDOT
 - c. Slurry Backfill: Use for backfill of over-excavated trenches, encasement of all penetration, and site utility piping.
 - 1) Maximum Aggregate Size: 3/8-inch
 - 2) Cement Type: Type I/II/IV/V
 - 3) Cement Content: 2.0 sacks/yd minimum
- B. Reinforcement shall comply with relevant portions of Division 32 Specification Section CONCRETE REINFORCEMENT.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Subgrade shall conform to the requirements of Division 31 Specification Section EARTHWORK: EXCAVATION, FILLING AND GRADING. The District may elect to verify compacted subgrade elevations by measurement made from adjacent existing improvements or by a template supported by forms.

3.2 GENERAL CONCRETE

- A. Concrete placement shall conform to the applicable requirements of Standard Specification Sections 51 and 90. Concrete shall not be placed when the air temperature in the shade at the project site exceeds 95° F or is below 45° F, or when the temperature of the concrete exceeds 85° F.
- B. After the concrete has been placed, it shall be struck off to proper section and compacted with a grid of parallel metal bars until a layer of mortar not less than 3/8 inch thick has been brought to

the surface. All exposed concrete surfaces shall receive a medium broom finish applied transversely to the line of pedestrian traffic or to the longest dimension of the concrete, as applicable.

- C. General concrete surfaces shall be cured by the curing compound method and shall be protected in accordance with the provisions of Subsections 90-1 and 90-2 of the Standard Specifications.

3.3 PROTECTION OF CONCRETE

- A. The Contractor shall be responsible for the condition of all concrete work until such time as all work has been completed and is accepted by the District. The Contractor shall limit vehicular travel across concrete until such time as the concrete has achieved strength sufficient that it can support traffic without damage. In no case, however, will vehicles be allowed to travel across new concrete improvements until seven calendar days have passed since the concrete was placed.

3.4 CONCRETE JOINTS

- A. Expansion joints and weakened plane joints shall be constructed at the locations shown on the plans or as directed by the Engineer. Where joint locations are not specified on the plans, expansion joints shall be constructed at maximum intervals of 30 feet, and weakened plane joints shall be constructed at maximum intervals of 10 feet.
- B. Expansion joints shall be considered as weakened plane joints for the purpose of spacing weakened plane joints. Expansion joints shall be tooled with a 1/4 inch maximum radius edger, and shall be filled with 3/8 inch pre-formed expansion joint filler.

3.5 CONCRETE FINISHES

- A. Where concrete is being installed adjacent to or near existing concrete improvements, match the finish of similar concrete surfaces (i.e. new sidewalks shall match existing sidewalks, new curbs shall match existing curbs, etc.).
- B. Sidewalks and Mowstrips: Medium sweat finish or medium broom finish perpendicular to the direction of travel.
- C. Curbs: Trowel smooth and finish with a light brush.
- D. Gutters: Medium broom finish parallel with curb or direction of flow.
- E. Drive approaches and wheelchair ramps: medium broom finish, perpendicular to the direction of travel.

3.6 INSTALLATION OF ACCESSORIES

- A. Strictly comply with manufacturer's instructions and recommendations and approved details. Securely anchor work to substrate.

3.7 REPAIR AND CLEAN-UP

- A. Contractor shall legally remove all trash, debris, containers and excess materials from the site on a periodic basis, and shall keep the work broom clean until Owner's acceptance.
- B. The Contractor shall be held responsible for the repair and/or replacement of new or existing improvements damaged as a result of this work to the satisfaction of the Owner.

- C. The Contractor shall provide roll-off bins for wash-out of ready mix concrete trucks and pumper. Do not allow concrete debris or cement water onto soils scheduled for landscape planting.

END OF SECTION 32 13 13

SECTION 32 31 13 CHAIN LINK FENCING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Provisions of constructing chain link fence at locations shown on the Construction Documents, including but not limited to:
 - a. Site chain link fencing and gates.
- B. RELATED SECTIONS
 - 1. Contract General Conditions and General Requirements
 - 2. Section 312000 – Earthwork: Excavation, Filling, and Grading
 - 3. Section 321313 – Site Concrete Improvements.

1.2 QUALITY ASSURANCE

- A. Qualifications of Installer
 - 1. Throughout the progress of installation of the work of this Section, provide at least one person who shall be thoroughly familiar with the specified requirements, completely trained and experienced in the necessary skills, and who shall be present at the site and shall direct all work performed under this Section.
 - 2. In actual installation of the work of this Section, use adequate numbers of skilled workmen to insure installation in strict accordance with the contract documents.
 - 3. In acceptance or rejection of work performed under this Section, the Engineer will make no allowance for lack of skill on the part of the workmen.

1.3 PRODUCT HANDLING

- A. Protection
 - 1. Use all means necessary to protect the materials of this Section before, during and after installation, and to protect the work of other trades.
- B. Replacements
 - 1. In the event of damage, immediately make all repairs and replacements necessary to the satisfaction of the Engineer and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The materials and fabrication of chain link fabric shall conform to these specifications, and as shown on the plans and details.
- B. All ferrous materials shall be new and galvanized. Imperfectly galvanized material or material upon which serious abrasions of the galvanizing occur shall not be used.
- C. Height - all fencing shall stand at the heights shown on the plans.
- D. Fabric
 - 1. Standard: Chain link fabric shall conform to ASTM, designation: A392, Class 1. The wire used in the manufacture of the fabric shall be 9-gauge. All chain link fabric shall be

woven into approximately 2-inch mesh. Fabric shall be furnished with knuckling at all selvages. The knuckled selvage shall be used along all corners and edges. Fabric shall be GBW, galvanized before weaving.

- E. Posts, braces and gate frames
 - 1. The base material for the manufacture of steel pipe used for posts and braces shall conform to the specifications of ASTM, designation: A53 Type A, standard weight, Schedule 40, and the base material for the manufacture of other steel sections used for posts and braces shall be good commercial quality weldable steel.
 - 2. All posts, braces and gate frames shall conform to the size and weight designations shown on the plans.
 - 3. All posts shall be fitted with rainproof caps designed so as to fit securely over the top of the posts.
 - 4. All posts shall be of a total length of not less than the depth of the concrete footing as shown on the plans, plus the length required above ground.
 - 5. Posts and braces shall be galvanized in accordance with specifications of ASTM, designation: A123.
 - 6. All horizontal braces shall be attached to posts by approved steel fixtures.
- F. Stretcher bars and other required fittings and hardware shall be steel and shall be galvanized in accordance with the specifications of ASTM, designation: A153.
- G. All swinging gates and walk gates shall be installed with a gate holdback, Trimco 1209HOHA-626. Holdbacks shall be installed in the concrete mowstrip, unless otherwise noted.
- H. Concrete mowstrip shall be in accordance with Section 321313 SITE CONCRETE IMPROVEMENTS.
- I. Walk gates shall be constructed as per detail drawing and in accordance with CBC sections 11B-206.5 and 11B-404.
- J. Drive gate, roll gate and walk gate shall be constructed as per detail drawing.
- K. Non-accessible swinging gates shall comply with the following:
 - 1. Have a lockable fork latch.
 - 2. Have heavy-duty malleable iron hinges

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All posts shall be set in concrete footings as shown on the plans to within 3 inches of bottom.
- B. All vertical line and end posts shall be braced to the nearest adjacent vertical post with galvanized horizontal braces as shown on the plans.
- C. Welding
 - 1. All welding shall conform to the requirements of the California Building Code, CBC Chapter 22.
 - 2. Where the galvanized surface has been burned by welding, all surfaces of the welded connections shall be thoroughly cleaned by wire brushing and all traces of the welding flux and loose or cracked galvanizing removed. The damaged area and weld shall then be painted in accordance with the following details.

- a. All galvanized, welded, or damaged surfaces that are to be painted shall first be cleaned by washing with mineral spirit solvent sufficient to remove any oil, grease or other materials foreign to the galvanized coating.
 - b. After washing, all areas shall be roughened by abrasive blasting using an abrasive that is no larger than 30-mesh. Galvanizing shall not be removed by this operation.
 - c. After preparation, all galvanized surfaces that are to be painted shall be covered with one application of zinc dust-zinc oxide primer, federal specification TT-P-641, Type II. The zinc dust-zinc oxide paint shall be applied by spraying to produce a complete covering of the galvanized surface.
 - d. After the application of the zinc dust-zinc oxide paint, one application of pre-treatment, vinyl wash primer, Section 91-2.7 of the state Standard Specifications, shall be applied to such surfaces. The vinyl wash primer shall be applied by spraying to produce a uniform wet film on the surface.
 - e. Such surfaces shall then be covered with two separate applications of white tint base vinyl finish coat, Section 91-2.22 of the state standard specifications, sufficient to completely cover the preceding color. Paint for the first application shall be tinted with a compatible coloring agent to slightly contrast with the color of the second application. After drying for 24 hours, one application of aluminum paint, finish coat, Section 91-2.8 of the state standard specifications, shall be painted on the welded areas.
- D. Perimeter fencing chain link fabric shall be fastened to the outside of the fence.
- E. All fabric shall be stretched and securely fastened to the posts, as follows:
- F. The fabric shall be fastened to end, corner and gate posts with 3/16 inch by 5/8 inch stretcher bars and not less than 1/8 inch by 3/4 inch stretcher bar bands spaced at one foot intervals for whatever widths of fabric are supplied. The fabric shall be fastened to line posts with tie wires or post clips. Tie wires shall be at least 9-gauge (0.148 inch diameter) steel. Post clips shall be at least 6-gauge (0.192 inch diameter) steel. The wire or clip fasteners shall be spaced at approximately 14 inches on line posts, with a minimum of 5 fasteners per 6 foot high post. Top and bottom edges of the fabric shall be secured to each horizontal brace with tie wires or fastened to tension wire with hog rings spaced at 15 inch maximum intervals. Hog rings shall be at least 9-gauge (0.148 inch diameter) steel. Wire ties shall be given at least one complete turn. Hog rings shall be closed with ends overlapping. The distance from the selvage to the braces or top rails shall be 2 inch maximum and shall be fastened to the brace or rail by wire fasteners spaced at approximately 14 inches with a minimum of 8 fasteners per each 10 foot horizontal span.
- G. Construct concrete mowstrip at the width as shown on the plans.

END OF SECTION 32 31 13

SECTION 33 12 00 WATER UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES:

- A. Pipe and fittings for on-site domestic piping.
- B. Valves and valve boxes.
- C. Accessories.

1.2 RELATED SECTIONS

- A. Contract General Conditions and General Requirements.
- B. Section 311100 - Site Clearing.
- C. Section 312000 - Earthwork: Excavation, Filling, and Grading
- D. Section 312222 - Soil Materials.
- E. Section 312333 - Trench Excavation and Backfill.
- F. Section 321313 - Site Concrete Improvements.

1.3 REFERENCES

- A. ASTM Test Method D1557.
- B. ANSI/ASTM D2466 - Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.
- C. ANSI/AWWA C110 - Ductile Iron and Grey-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids.
- D. ANSI/AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
- E. ANSI/AWWA C500 - Gate Valves, 3-inch through 48-inch NPS, for Water and Sewage Systems.
- F. ANSI/AWWA C900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch, for Water.
- G. ASTM D1785 - Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and Class 200.
- H. ASTM D2855 - Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.
- I. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

1.4 SUBMITTALS

- A. Submit in accordance with Specification Section SUBMITTALS and the Contract General Conditions.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

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

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Contract General Conditions and Division 1 Specifications.
- B. Accurately record actual locations of piping mains, valves, connections and appurtenances, referenced to permanent surface features.
- C. Identify and describe discovery of uncharted utilities or utilities found at locations different than indicated on plans.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with product manufacturer's recommendations and these Contract Documents.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle all products required.

PART 2 - PRODUCTS

2.1 WATER PIPE

- A. Ductile Iron Pipe (for iron pipe larger than 3 inches in diameter, above ground): ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51, thickness Class 50, with cement - mortar lining and seal coating per ANSI/AWWA C104/A21.4.
 - 1. Fittings: ANSI/AWWA C110/A21.10, ductile iron.
 - 2. Joints: Flanged.
- B. PVC Pipe (for pipe 3 inches and smaller, underground): ASTM D1785, Schedule 40.
 - 1. Fittings: ASTM D 2464, Schedule 80 PVC (ASTM D 2466, Schedule 40 PVC for pipes 1-1/2 inches and smaller).
 - 2. Joints: ASTM D 2855, solvent weld.
- C. PVC Pipe (for pipe 4 inches and larger, underground): ANSI/AWWA C900 Class 305.
 - 1. Fittings: ANSI/AWWA C111, ductile iron.
 - 2. Joints: ASTM D 3139 compression gasket ring.
- D. Locator Tape: Tape shall be an inert material such as polyethylene plastic with a metallic core, and highly resistant to alkalis, acids, or other chemical components likely to be encountered in soils. The tape shall be bright colors for contrast with the soils with identifying print in black letters. The tape shall be six inches wide and be printed "CAUTION - WATER LINE BELOW".

2.2 VALVES - UP TO 2 INCHES (50 MM)

- A. Use full port ball valves for 2 inches and smaller and resilient wedge gate valves for 2-1/2 inches and larger size.
- B. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, IPS ends.

2.3 GATE VALVES - 2-1/2 INCHES (63 MM) AND OVER

- A. ANSI/AWWA C509, Iron body, bronze trim, non-rising stem with square nut or control handle wheel, resilient single wedge, threaded or flanged.

2.4 VALVE BOXES

- A. Precast concrete with cast iron lid marked for service. Christy No. G5 or approved equal.
- B. Valve boxes shall have a minimum 6 inch wide by 4 inch (6" inches in vehicular areas) thick concrete collar.

2.5 ACCESSORIES

- A. Concrete for Thrust Blocks and Valve Box Surface Collars: Concrete type specified in Specification Section SITE CONCRETE IMPROVEMENTS.
- B. Valve Boxes and Covers: Christy No. G5 traffic box, or approved equal. Cover marking shall read "Water". A one-piece PVC riser extension shall be provided as necessary to allow unobstructed access to valve operating nut.
- C. Solvent Cement and Primer for PVC Pipe and Fittings: Per ASTM F656 and ASTM D2564.
- D. Non-Firming Anticorrosion Wrap: Trenton Wax-Tape #1 or approved equal for application on belowground metal surfaces, pipe, or fittings in corrosive soils.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions. All plot dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions and report any variations to the Engineer.
- B. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, etc., which may be required. Carefully investigate the structural and finished conditions affecting all work, and plan work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Unless dimensions are shown, drawings are generally diagrammatic and indicative of the work to be installed in the most direct and workmanlike manner, so that conflicts between water systems, planting, and architectural features will be minimized.
- C. Do not install the facilities as indicated on the drawings when it is obvious in the field that unknown obstructions might not have been considered in the engineering. Such obstructions or differences should be brought to the attention of the Engineer before proceeding.

3.2 PREPARATION

- A. Prepare for pipe installation by assembling all needed materials.
- B. Cover all PVC pipe during storage.

3.3 BEDDING

- A. Excavate trench, pit or hole in accordance with Specification Section TRENCH EXCAVATION AND BACKFILL.

- B. Where trench or pit has been overexcavated, place bedding material at bottom of excavations, level soil materials in continuous layers not exceeding 8-inches loose uncompacted depth.
- C. Backfill around sides and to a level 12-inches above the top of pipe with bedding sand, tamped in place.
- D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE AND FITTINGS

- A. Install pipe at locations and depths indicated on plans.
- B. Install pipe, fittings, and associated materials in accordance with manufacturer's recommendations.
- C. Route pipe in straight line, whenever possible. All changes in direction of pipes shall be made with fittings, not by bending.
- D. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- E. Form and place concrete for thrust blocks at each elbow, tee, angle or other significant change of direction in loose-joint pipe, per detail on plans.
- F. Establish elevations of buried piping to ensure not less than 30-inches of cover, except at connections to existing lines, which may be shallower or deeper, or where shown otherwise on plans.
- G. When two water pipes are to be installed in same trench, maintain a minimum 4-inch horizontal clearance between pipes.
- H. Backfill trench or other excavation in accordance with Specification Section TRENCH EXCAVATION AND BACKFILL.

3.5 INSTALLATION - VALVES

- A. Set valves on solid bearing.
- B. Where valves are installed below finish surface grade, center and plumb valve box and any necessary extensions over valve. Set box cover flush with finished grade.
- C. Pour concrete collar around top of valve box per detail on plans.
- D. Furnish and install valves and valve boxes in addition to those shown on plans as required for isolation of lines for construction and disinfection, while minimizing disruption of service to buildings, at no additional cost to the Owner.

3.6 INSTALLATION - THREADED CONNECTIONS

- A. Assemble all plastic and galvanized steel threaded pipe and fittings using an approved Teflon tape applied to the male threads only. A minimum of two (2) wraps and a maximum of three (3) wraps of an approved Teflon tape will be required.
- B. At all plastic (PVC) pipe connections, work the ductile iron connections first. Connections shall always be plastic into steel, never steel into plastic.

- C. A non-hardening sealant and lubricant similar to Permatex #51 or LASCO blue pipe sealant may be used in lieu of Teflon tape. Apply sealant to clean male threads brushing into grooves and to the first three threads of the female threads.

3.7 PRESSURE TESTING OF SITE WATER PIPING SYSTEM

- A. General: Unless otherwise directed, tests shall be witnessed by Inspector. Work to be concealed shall not be covered until prescribed tests are made. Should any work be covered before such tests, the Contractor shall, at his expense, uncover, test and repair his work and that of other contractors to original conditions. Leaks and defects shown by tests shall be repaired and entire work re-tested. Tests may be made in sections, however, all connections between sections previously tested and new section must be included in the test.
- B. Water Piping: Pressure test all onsite water piping systems in accordance with AWWA Standard C605, "Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings". The pressure testing process shall be performed in cooperation with the authority having jurisdiction and witnessed by the Owner's Inspector. The constructor shall supply an affidavit of compliance to the Owner as required by AWWA Standard 605. Maintain 150 PSIG water pressure for a duration of four (4) hours. There shall be no drop in pressure during test except that due to ambient temperature changes. Flush all lines prior to pressure test.
- C. Backflow Preventer: All backflow preventers shall be tested according to manufacturer's recommendations and the USC Cross Connection Control and Hydraulic Research Manual latest edition and per local AHJ requirements. Testing shall be performed by an AWWA Certified Backflow Prevention Assembly Tester. Contractor shall provide written certification to the Architect showing the date in which the backflow preventers were tested and confirmation that unit passed all test requirements.

3.8 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Disinfect all domestic water piping systems in accordance with AWWA Standard C651, "Disinfecting Water Mains", and in accordance with administrative authority. Disinfection process shall be performed in cooperation with health department having jurisdiction and witnessed by the Owner's Inspector. During procedure, signs shall be posted at each water outlet stating, "Chlorination - Do Not Drink". After disinfection, water samples shall be collected for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained and delivered to the Owner by the Owner's Inspector.

3.9 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of the Contract General Conditions and Division 1 Specifications.
- B. Compaction testing of bedding and backfill will be performed in accordance with ANSI/ASTM D1557.
- C. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest. Any retests required due to failure of initial tests shall be paid for by the Contractor.

END OF SECTION 33 12 00

SECTION 33 30 00 SITE SEWER SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

- A. Sanitary Sewer Pipelines and Fittings
- B. Site Accessories

1.2 RELATED SECTIONS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions, apply to the work of this section.
- B. Section 311100 - Site Clearing
- C. Section 312000 - Earthwork: Excavation, Filling, and Grading
- D. Section 312222 - Soil Materials
- E. Section 312333 - Trench Excavation and Backfill
- F. Section 321313 - Site Concrete Improvements

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies
 - 1. Safety Regulations: Work shall comply with all Federal, State and Municipal regulations regarding safety, including the requirements of the following:
 - a. William-Steiger Occupational Safety & Health Act of 1970.
 - b. State of California, California Administrative Code, Title 8 Industrial Relations, Chapter 4, Subchapter 4, "Construction of Safety Orders" and other State and local agencies having jurisdiction.
 - c. All trenching work shall conform to Trench Construction Safety Orders of California State Industrial Accident Commission.

1.4 REFERENCES

- A. American Water Works Association (AWWA).
- B. American Society for Testing and Materials (ASTM):
 - 1. Designation D3034 - Polyvinyl Chloride (PVC) pipe.
- C. California Plumbing Code, 2022 Edition (CPC).
- D. Local County Health Department Standards.

1.5 SUBMITTALS

- A. Submit under provisions of Specification Section - SUBMITTAL PROCEDURES. Certificates of compliance for material
- B. Product Data: Provide data indicating pipe, accessories, and associated equipment to be furnished.
- C. Submit manufacturer's data and/or fabrication drawings for Sanitary Sewer Pipelines, Sanitary Sewer Manholes and Sanitary Sewer Fittings, installed under this Section. No items shall be incorporated into the work until submittals are approved by the Engineer.

1.6 COORDINATION

- A. Verify location of existing utilities have been indicated at by local utility authorities.

1.7 EXISTING UTILITIES

- A. The Engineer has made a diligent attempt to indicate on the plans the location of all main and trunkline utility facilities which may affect the Work. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- B. Service laterals and appurtenances have also been shown where information was available as to their location. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- C. At new work location, expose by hand methods all existing utilities along the route of the new work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand methods to locate all existing facilities as indicated on the plans, and as indicated at the work site by local utility authorities.
- D. Maintain all existing utility mains and service lines in constant service during construction of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Sanitary sewer pipelines for pipes 4 inches and larger shall be polyvinyl chloride (PVC) pipe conforming to ASTM Designation 3034, SDR-35, with elastomeric gasket joints per ASTM D 3212 and F477.
- B. Sanitary sewer pipelines for pipe less than 4 inches shall be Schedule 40 PVC pipe, ASTM D1785.
- C. All sanitary sewer fittings shall be watertight connections using PVC sewer fittings as approved by the California Plumbing Code, or approved equal to be determined by the Civil Engineer.
- D. Surface cleanout shall be precast concrete with cast iron lid marked for service Christy G5 or approved equal and constructed as per detail drawing and 2022 California Plumbing Code.
- E. Locator Tape: Tape shall be an inert material such as polyethylene plastic with a metallic core, and highly resistant to alkalis, acids, or other chemical components likely to be encountered in soils. The tape shall be bright colors for contrast with the soils with identifying print in black letters. The tape shall be six inches wide and be printed "CAUTION - SEWER LINE BELOW".

PART 3 - EXECUTION

3.1 CLEARING OF WORK SITE FOR SITE IMPROVEMENTS

- A. Clear site for improvements per construction drawing demolition plan and in accordance with Specification Section SITE CLEARING.

3.2 TRENCH EXCAVATION

- A. Trench excavation and backfilling shall be in accordance with Specification Section TRENCH EXCAVATION AND BACKFILL and construction drawing detail.

3.3 SOIL MATERIALS

- A. Excavated materials and imported materials shall meet engineering recommendations in accordance with Specification Section SOIL MATERIALS.

3.4 PIPE INSTALLATION

- A. Pipe Laying: Alignment and elevation stakes shall be set at intervals with offsets and cut to the invert of the pipe.
 - 1. Proper facilities shall be provided for stringing and lowering sections of pipe into the trench. The pipe shall be laid carefully to lines and grades given.
 - 2. The grade line shown on the plans indicates the flow line or invert of the pipe and all cuts, unless otherwise indicated, refer to this line.
 - 3. After the trench for pipe has been brought to the proper line and grade, the pipe shall be laid in the following manner.
 - a. Pipe laying shall proceed upgrade with the bell ends of bell and spigot pipe placed upstream. Each section of pipe shall be laid to line and grade as herein specified and in such a manner as to form a watertight, concentric joint with the adjoining pipe. The interior of the pipe shall be cleared of all dirt and debris and excess joint sealing material as the work progresses. Pipe shall not be laid when the condition of the trench or weather is unsuitable. All open ends of pipe and fittings shall be adequately and securely closed whenever the work is discontinued for more than one-half hour. If pipe with elliptical or quadrant reinforcement is used, care shall be taken to properly orient the axis.
 - 4. All joint surfaces shall be cleaned before joints are made.
 - 5. The Contractor shall furnish and use, for grade and alignment control, a laser beam system which complies with OSHA requirements. The laser system shall have good visibility when used with suitable target material. The laser system must be of the self-leveling type so that the laser beam is automatically compensated for minute grade disturbances.
 - 6. The laser system must also have an early warning system that instantly warns the pipe layer when the laser is off grade. The laser system is to be provided by the Contractor and shall have a minimum accuracy of ± 0.01 foot per one hundred feet (100') on line; and a minimum visible range of one thousand feet (1000'). When conditions are such that this method is impractical, such as on short pipe runs, the Contractor shall have an Engineer on the ground to set grade of each joint of pipe by means of an Engineer's level.
- B. Sewer Systems Plugs: Temporary plugs of brick or mortar shall be installed on all sewer projects at points of connection to existing facilities. These plugs shall remain in place until completion of the balling and flushing operation. The plugs, intended to prevent water from the balling and flushing operation, drainage, or any other condition from entering the existing system, shall be installed or removed in the presence of and under the direct supervision of the Engineer. Until the system has been pumped clear of accumulated water, the plugs shall not be removed. This water must not be allowed to enter adjacent sewer or drainage systems.
- C. Internal Inspection: Upon completion of construction and prior to final inspection, the Contractor shall clean the entire new pipeline of all dirt and debris. Any dirt or debris in previously existing pipes or ditches in the area, which in the opinion of the Engineer resulted from the new installation, shall also be removed by the Contractor. Sewer pipes shall be cleaned by the controlled balling method. Temporary plugs shall be installed and maintained during cleaning operations at points of connection to existing facilities to prevent water, dirt, and debris from entering the existing facility. Temporary plugs for sewer systems shall also conform to

Subsection B, above. Water from the drainage system operations shall be routed through a suitable trap to collect any dirt and debris prior to discharging into any downstream facility. The Contractor shall notify the Architect immediately after completion of the pipe cleaning operations. Cleaning of drainage pipes by the controlled balling method will not be required.

- D. As soon as possible after the completion of the pipe cleaning, and prior to final acceptance, the Architect or Engineer may make a visual internal inspection of the new pipeline either manually or with television equipment.

3.5 COORDINATION

- A. Coordinate with the campus for the shutdown of the existing sewer system to make new sewer connection. Install sewer pipelines before making tie-in to the existing sewer pipeline. Tie-in work may proceed during the campus non-use of the existing sewer system such as on weekends.

3.6 TESTING OF SANITARY SEWERS

- A. After cleaning per Section 3.4-C, each section of sewer constructed shall be tested in accordance with acceptable "Low Pressure Air Test for Sanitary Sewers" methods such as presented in the Journal of Sanitary Engineering, Division ASCE, April 1964, to test the point of effluent disposal. All lines and components shall be leak proof.

3.7 INSPECTION OF SANITARY SEWERS

- A. System components shall be properly identified as to the manufacturer.

3.8 CLEAN-UP

- A. Remove from the site all rubbish, debris, etc. in a lawful manner, resulting from work in this Section. The clean-up shall include the replacement and repair of any damaged or disturbed property.

END OF SECTION 33 30 00

SECTION 33 40 00 STORM DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and District's General Conditions, apply to this Section.

1.2 SUMMARY:

- A. This section includes the following:
 - 1. Provide all materials, labor, equipment and services necessary to furnish and install Storm Drainage System, accessories and other related items necessary to complete the Project as indicated by the Contract Documents unless specifically excluded.
- B. RELATED SECTIONS:
 - 1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Divisions 00 and District's General Conditions, apply to this work.
 - 2. Section 312222 – Soil Materials
 - 3. Section 312333 – Trench Excavation and Backfilling.
 - 4. Section 321313 – Site Concrete Improvements.

1.3 REFERENCES

- A. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- B. ANSI/ASTM C443 Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- C. ANSI/ASTM C478 Precast Reinforced Concrete Manhole Sections.
- D. ASTM D1557

1.4 DEFINITIONS

- A. Bedding: Fill placed under, around, beside and directly over pipe, prior to subsequent backfill operations.
- B. Utility: Any buried or above ground pipe, conduit, cable, associate device or appurtenances, or substructure pertaining thereto.

1.5 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Certificates of compliance for material.
- C. Product Data: Provide data indicating pipe, accessories, and associated equipment to be furnished.

- D. Submit manufacturer's data and/or fabrication drawings for all pipes, and appurtenances installed under this Section. No items shall be incorporated into the work until submittals are approved by the Architect/Engineer

1.6 COORDINATION

- A. Coordinate work with Owner's personnel.
- B. Verify that the location of existing utilities have been indicated at work site by utility authorities and Owner's personnel.
- C. Coordinate work with other project work.

1.7 EXISTING UTILITIES

- A. The Engineer has made a diligent attempt to indicate on the plans the location of all main and trunkline utility facilities which may affect the Work. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- B. Service laterals and appurtenances have also been shown where information was available as to their location. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- C. At new work location, expose by hand methods all existing utilities along the route of the new work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand methods to locate all existing facilities as indicated on the plans, and as indicated at the work site by Owner's personnel.
- D. Maintain all existing utility mains and service lines in constant service during construction of the Work

1.8 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division 01.
- B. Accurately record actual locations of utilities encountered.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforced Concrete Pipe for pipe larger than fifteen (15) inches: ANSI/ASTM C76, Class 3, with rubber gasket joints per ANSI/ASTM C443.
- B. Storm drainage sewer pipeline shall be polyvinyl chloride (PVC) pipe for storm sewer conforming to ASTM designation 3034, SDR 35, with elastomeric gasket joints per ASTM D 3212 for pipe fifteen (15) inches or less.
- C. Storm drainage pipeline shall be polyvinyl chloride (PVC) pipe for storm sewer conforming to ASTM D1785, Schedule 40, for pipe three (3) inches or less.

- D. Poured in Place Concrete: Specification Section SITE CONCRETE IMPROVEMENTS.
- E. Mortar: Composed of one part, by weight, portland cement (Type II low alkali per ASTM C150), 2 parts, by weight, sand, and water.
- F. Manhole Frames, Covers and Grates: Cast Iron per ASTM A48, Class 25.
- G. Soil Fill for Concrete Pipe Bedding Envelope: Specification Section TRENCH EXCAVATION AND BACKFILL.
- H. Catch basins and drain inlets shall be constructed as per detail drawing.
- I. Concrete collar shall be constructed as per detail drawing.
- J. Cleanout shall be precast concrete with cast iron lid marked for service Christy G5 or approved equal and constructed as per detail drawing.
- K. All metallic pipe, fittings and appurtenances in contact with soil shall be coated or wrapped with an approved material, as required to protect it from corrosive soil.
- L. Locator Tape: Tape shall be an inert material such as polyethylene plastic with a metallic core, and highly resistant to alkalis, acids, or other chemical components likely to be encountered in soils. The tape shall be bright colors for contrast with the soils with identifying print in black letters. The tape shall be six inches wide and be printed "CAUTION – STORM SEWER LINE BELOW".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site conditions.

3.2 PREPARATION

- A. Identify location of proposed storm drainage facilities to be constructed. Expose connection points to existing system.
- B. Locate, identify, and protect existing above and below grade utilities from damage.
- C. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.
- D. Protect existing structures and other improvements to remain from damage from excavation equipment and vehicular traffic.
- E. Employ equipment and methods appropriate to the work site.
- F. Protect excavated areas from drainage inflow, and provide drainage to all excavated areas. Dewater existing drainage basins and existing drainage pipeline systems as necessary to accomplish the work.
- G. Comply with safety requirements as they pertain to excavations, per Specification Section EARTHWORK.
- H. Remove all interfering surface and subsurface improvements authorized for removal.

3.3 EXCAVATION

- A. Excavate soil required to locate existing utilities and install the work.
- B. Excavate trenches and pits per Specification Section EARTHWORK.
- C. Excavate trenches and pits to allow installation and construction of the storm drainage facilities to the alignment, grades, depths and cross-sections as indicated on the construction plans.
- D. Excavate trench to depth which is 6 inches below the outside bottom of the pipe barrel to be placed therein.
- E. Cut trenches just wide enough to allow the installation of the pipe and pipe bedding as indicated on the plans. Minimize trench width above the pipe.
- F. Provide protection to public per Division 01.

3.4 INSTALLATION AND BEDDING OF STORM DRAIN PIPE

- A. Install the pipe and fittings to the lines and grades shown on the construction plans.
- B. Install pipe and fittings in accordance with the manufacturer's recommendations, and these specifications.
- C. Unless otherwise approved by the Engineer, lay all pipe upgrade from structure to structure, with bell or socket ends of pipe upgrade.
- D. Excavate suitable bell (or socket) holes in the bedding material, so that the bells do not bear on the subgrade or bedding. Provide uniform bearing of pipe barrel on bedding material.
- E. Ensure that all joints are properly "homed" and are watertight.
- F. Bed concrete pipe in backfill or sandfill soil envelope, and compact to a minimum of 90% relative compaction. Place and compact the bedding material under, around and over the pipe, filling the trench cavity and extending from the bottom of the trench (6 inches below the outside bottom of the pipe barrel) to a level 12 inches above the outside top of the pipe barrel.

3.5 INSTALLATION OF STORM DRAINAGE STRUCTURES AND APPURTANCANCES

- A. Install storm drainage structures as indicated on the construction plans, in accordance with the manufacturer's recommendations, and as specified herein.
- B. Construct poured-in-place concrete per Specification Section SITE CONCRETE IMPROVEMENTS.
- C. Key top of poured-in-place concrete bases for structures to receive the tongue of precast riser sections.
- D. Construct cleanout, outfall structure per detail drawing.

3.6 BACKFILLING TO FINISHED GRADE AND FINISHED GRADING

- A. Place and compact backfill per Specification Section TRENCH EXCAVATION AND BACKFILL.

- B. Conform finished surface to the lines, grades and cross-sections shown on the plans, or as otherwise directed by the Inspector.
- C. In areas to receive paving or a significant thickness of sealing material, temporarily set manhole frame and cover below finish grade, then return after final surfacing and/or pavement sealing and bring manhole frame and cover to final grade, as shown on the plans.
- D. Fine grade all finished soil surfaces disturbed to the lines, grades and cross-sections shown on the plans.
- E. Rake and smooth all finished dirt surfaces.

3.7 TOLERANCES

- A. Pipe laying tolerances:
 - 1. Above grade: Not to exceed 1/4-inch above planned grade.
 - 2. Below grade: Not to exceed 1/2-inch below planned grade.
 - 3. Alignment: Not to exceed 2 inches from planned alignment, if gradual and regular over a distance of 20 feet.
- B. Structure finish grade tolerance: Within 1/4 inch of planned grade, but must match adjacent improvements.

3.8 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 01.
- B. Compaction testing of bedding and backfill will be performed in accordance with ASTM D 1557.
- C. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest at no additional cost to Owner.

END OF SECTION 33 40 00



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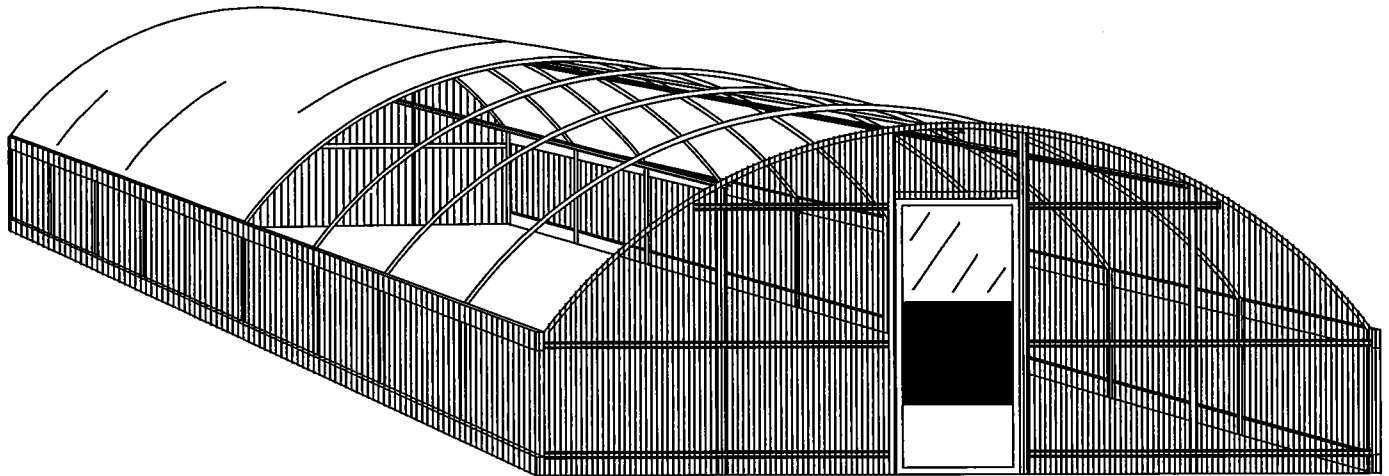
SERVING AGRICULTURE SINCE 1946

A DIVISION OF JOHN L. CONLEY, INC.

GENERAL CONTRACTORS LICENSE NO. 323391-B

COLD FRAME SERIES 1100 GREEN HOUSE SYSTEM

IMPORTANT!!!!
NON - CODE COLD FRAMES REPRESENT A NON - CODE- NON
ENGINEERED DESIGN WITH CERTIFICATION UNAVAILABLE. IT IS
NOT RECOMMENDED THAT THIS HOUSE BE UTILIZED IN REGIONAL
AREAS REPRESENTING SNOW OR HIGH WIND FACTORS.



20'-0" & 24'-0" WITH LEGS
INSTRUCTION MANUAL

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INTRODUCTION

SHOULD YOU HAVE ANY QUESTIONS CONCERNING THESE INSTRUCTION, COMPONENTS ETC...,PLEASE CONTACT US DIRECTLY. WE WELL BE GLAD TO ANSWER ANY QUESTIONS CONCERNING OUR MANUFACTURED PRODUCT.

INCLUDED IN THIS PACKAGE ARE INSTRUCTIONS AND DETAILED DRAWINGS PERTAINING TO YOUR CONLEY'S GREENHOUSE SYSTEM. STUDY THE INSTRUCTIONS BEFORE BEGINNING CONSTRUCTION TO BECOME FAMILIAR WITH OUR PRODUCT AND HOW IT IS ASSEMBLED.

STORE ALL MATERIALS OFF THE GROUND ON WOOD BLOCKS. PROTECT ALL YOUR MATERIALS FROM THEFT AND/OR DAMAGE. YOU MAY WISH TO DISCUSS BUILDERS RISK INSURANCE WITH YOUR INSURANCE AGENT.

DISCLAIMER

THE FOLLOWING INSTRUCTIONS ARE GIVEN AS SUGGESTED GUIDELINES FOR GENERAL INSTRUCTIONS. CONLEY'S MANUFACTURING AND SALES OR ANY OF THEIR EMPLOYEES SHALL NOT BE RESPONSIBLE RESULTING FROM PURCHASERS IMPLEMENTATION OF THESE INSTRUCTIONS. PURCHASERS ALONE SHALL RESPONSIBLE FOR CONFORMANCE WITH ALL APPLICABLE LAWS, ORDINANCES, AND SAFETY STANDARDS IN CONSTRUCTING THIS GREENHOUSE AND ALL EQUIPMENT INSTALLED THEREIN.

NOTICE TO CONLEY'S CUSTOMERS PROTECT YOURSELF FROM ADDED COSTS!

ALL PRODUCTS ARE SOLD F.O.B. SHIPPING POINT, AND THE ATTACHED MEMORANDUM COPY OF BILL OF LADING THAT INDICATES THAT MATERIAL SHIPPED HAS NOW, BY LAW, BECOME YOUR PROPERTY AND IS AN ACKNOWLEDGMENT BY THE TRANSPORTATION COMPANY OF THE RECEIPT OF THE MATERIALS IN GOOD CONDITION.

SAFE DELIVERY OF THIS SHIPMENT IS NOW THE RESPONSIBILITY OF THE CARRIER WHO ACTS AS YOUR AGENT. WE WILL BE GLAD TO RENDER ASSISTANCE TO TRACE AND RECOVER LOST GOODS.

EXAMINE THE SHIPMENT CAREFULLY BEFORE SIGNING THE FREIGHT BILL. IF ANY DAMAGE IS NOTED, OR OF THE NUMBER OF PIECES DOES NOT AGREE WITH THE BILL OF LADING, INSIST THAT SHORTAGE OR DAMAGE BE NOTED ON THE FREIGHT BILL BY THE CARRIERS AGENT. FAILURE TO DO SO MAY JEOPARDIZE YOUR RECOVERY.

DO NOT REFUSE SHIPMENT AS THIS IS YOUR PROPERTY AND REFUSAL CAUSES UNNECESSARY DELAYS AND SHORTAGE EXPENSES. ARRANGE WITH CARRIER WITHIN 15 DAYS TO INSPECT AND MAKE REFERENCE THERE TO ON THE FREIGHT BILL. CONSULT YOUR CARRIER FOR DISPOSITION OF DAMAGED ARTICLES.

MAKE YOUR CLAIM PROMPTLY, THE TRANSPORTATION COMPANY WILL NOT CONSIDER A CLAIM UNLESS IT IS PRESENTED WITHIN 9 MONTHS FROM THE DATE OF SHIPMENT. CARRIERS AGENT WILL ASSIST YOU IN PREPARING A CLAIM.

CLAIMS FOR LOSS OR DAMAGE AND TRANSPORTATION CHARGES RESULTING FROM SHIPPING, MUST NOT BE DEDUCTED FROM THE INVOICE, NOR PAYMENT INVOICES WITHHELD AWAITING ADJUSTMENT OF SUCH CLAIMS, SINCE IT IS THE FUNCTION OF THE CARRIER TO GUARANTEE SAFE DELIVERY.

CHECK THE ITEMS RECEIVED WITH THE INVOICE. OF THERE IS ANY DISCREPANCY CONTACT US IMMEDIATELY GIVING FULL PARTICULARS. CLAIMS FOR SHORTAGE ATTRIBUTED TO OUR COUNT IN PACKAGE MUST BE MADE WITHIN 10 DATES FROM THE SHIPPING IS RECEIVED.

NO MERCHANDISE MAY BE RETURNED FOR CREDIT WITHOUT A RETURN GOODS TAG AND SHIPPING INSTRUCTIONS FROM THE FACTORY.

WARRANTY

CONLEY'S MANUFACTURING AND SALES, THEIR EMPLOYEES OR REPRESENTATIVES, WILL NOT BE RESPONSIBLE FOR ANY DAMAGES TO GREENHOUSE COVERINGS, STRUCTURES, CROPS OR EQUIPMENT WHEN USED IN CONDUCTION WITH OUR TUBE - LOCK, OR ANY OTHER LOCKING DEVICE MANUFACTURED BY CONLEY'S MANUFACTURING AND SALES OR OTHERS.

NOTATION OF INSTRUCTIONS PROVIDED

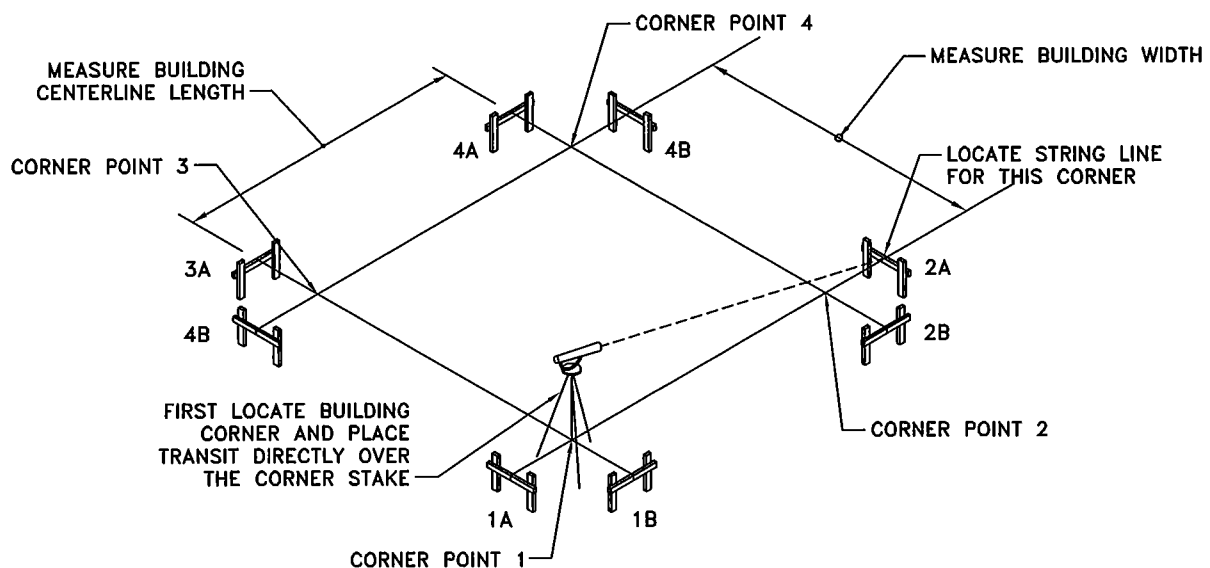
CONLEY'S MANUFACTURING AND SALES, PROVIDE INSTALLATION INSTRUCTIONS AND PRINTS ARE GEARED TOWARDS A QUALIFIED BUILDER WITH PRIOR GREENHOUSE BUILDING EXPERIENCE. IF A QUALIFIED BUILDER IS NOT AVAILABLE, CONLEY'S CAN SUPPLY AT AN ADDITIONAL CHARGE, A FACTORY TRAINED SUPERVISOR TO ASSIST LOCAL CREWS, OR ALTERNATIVELY, AT AN ADDITIONAL CHARGE SUPPLY A CREW TO COMPLETE THE INSTALLATION OF MATERIALS.

GRADE AND PREPARE THE BUILDING SITE

1. REMOVE THE GRASS AND DEBRIS DOWN TO SOLID SOIL.
2. LOCATE THE BUILDING CORNERS AND SET THE GRADING STAKES 5' BEYOND THE CORNERS.
3. A TRANSIT LEVEL IS NEEDED TO SURVEY THE AREA OF THE BUILDING. IN ORDER TO INSURE PROPER DRAINAGE AND EVEN HEATING, THE WIDTH SHOULD BE SET LEVEL AND THE LENGTH SHOULD BE SET LEVEL WITHIN APPROXIMATELY 1%.
4. CUT AND FILL THE SITE UNTIL IT IS AT THE RECOMMENDED GRADE.

LAYOUT AND SQUARE THE FOUNDATION

1. ROUGHLY LOCATE THE CORNERS OF THE BUILDING AND DRIVE IN THE CORNER STAKES.
2. SET BATTER BOARDS APPROXIMATELY 6' (OR ADEQUATE DISTANCE FROM AUGER CLEARANCE) BACK FROM THE CORNERS IN EACH DIRECTION. SET INTERMEDIATE BATTER BOARDS OF THE BUILDING IS LONGER THAN 50 FEET TO KEEP THE LINES FROM SAGGING OR BLOWING IN THE WIND.
3. LOCATE THE FIRST BUILDING CORNER POINT AND MARK IT WITH A STAKE OR NAIL HEAD.
4. MEASURE FROM CORNER POINT 1, THE SPECIFIED DIMENSION OF THE BUILDING, TO LOCATE CORNER POINT 2. PULL A TIGHT LINE BETWEEN BATTER BOARD "1A" AND BATTER BOARD "2A", MAKING SURE THE LINE PASSES OVER CORNER POINT 1 AND CORNER POINT 2. FASTEN THE LINE TO THE BATTER BOARDS AND CHECK IT WITH TRANSIT. MAKE SURE THE BATTER BOARDS AND LINES ARE LEVEL (SEE FIG. 1). VARIATIONS IN THIS WILL ULTIMATELY AFFECT THE AVE HEIGHT.



SEE PAGE 7 FOR GUTTER CONNECTED HOUSES

FIGURE 1 - LOCATING CORNER POINT 2

5. TO LOCATE THE THIRD CORNER POINT (FIG 2), YOU MAY USE ONE OF TWO METHODS, THE DIAGONAL METHOD OR THE TRIANGLE METHOD.

THE DIAGONAL METHOD - RUN A LINE DIAGONALLY ACROSS FROM CORNER TO CORNER AND ADJUST THE LINES UNTIL THE DIAGONAL DIMENSIONS ARE EQUAL (SEE FIG. 3)

THE TRIANGLE METHOD - CREATE A 90° ANGLE FROM THE FIRST LINE USING CORNER POINT 1 AS A VERTEX. THIS ANGLE MAY BE ACCOMPLISHED BY USING TWO TAPE MEASURES AND THE CHART LISTED BELOW (SEE FIG. 4) (USE THIS METHOD FRO LARGER BUILDINGS WHERE THE LENGTH OF THE DIAGONAL EXCEEDS THE 100 FOOT TAPE MEASURE).

WHEN YOU'VE LOCATED CORNER POINT 3, PULL YOUR SECOND LINE BETWEEN BATTER BOARD "1B" AND BATTER BOARD "3B" MAKING SURE IT PASSES OVER CORNER POINT 1 AND CORNER POINT 3. CHECK WITH TRANSIT MAKING SURE THAT BATTER BOARDS AND LINES ARE LEVEL (SEE FIG. 2.)

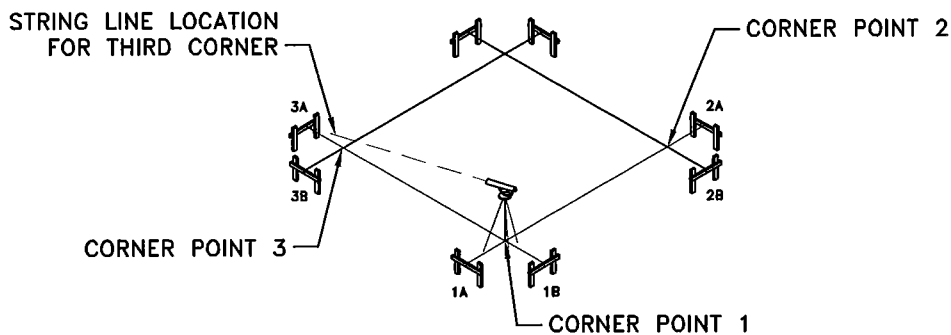


FIGURE 2 - LOCATING CORNER POINT 3

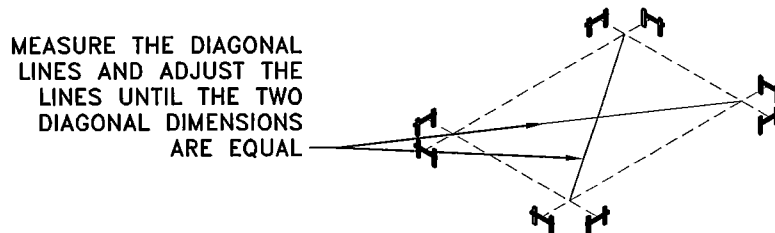


FIGURE 3 - DIAGONAL METHOD

DIMENSION A ² + DIMENSION B ² + DIMENSION C ²		
20'	15'	25'
24'	18'	30'
28'	21'	35'
32'	24'	40'
36'	27'	45'
40'	30'	50'

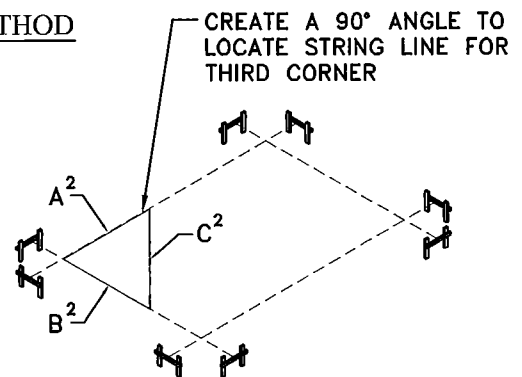


FIGURE 4 - TRIANGLE METHOD

6. TO LOCATE THE FOURTH CORNER POINT (FIGURE 5), USING TWO TAPE MEASURES, FROM CORNER POINT 3 AND CORNER POINT 2, THE SPECIFIED LENGTH AND WIDTH. THE POINT AT WHICH THESE LINES INTERSECT WILL BE CORNER POINT 4.
7. NOW YOU MAY PULL YOUR LAST TWO LINES AND FASTEN THEM TO THE APPROPRIATE BATTER BOARDS. BE SURE TO CHECK THE LEVEL OF YOUR LINES (FIGURE 5).

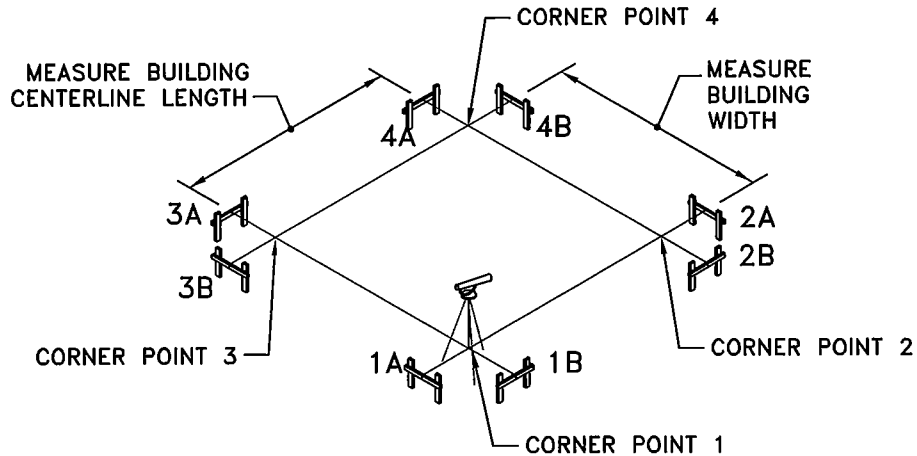


FIGURE 5 - LOCATING CORNER POINT 4

FIND COLUMN CENTERS

1. MARK THE CORNER POINTS ON THE LINES, AND USE A 100 FOOT TAPE MEASURE TO MARK THE INTERMEDIATE HOLE CENTERS ON THE LINES.
2. USING A LEVEL FOR VERTICAL ACCURACY, MARK THE HOLE CENTERS ON THE GROUND WITH NAILS. PAINT THE NAIL HEADS WITH FLUORESCENT PAINT.
3. MEASURE DOWN THE WIDTH OF THE LINES AND MARK THE END WALL UPRIGHT CENTERS IN THE SAME MANNER.

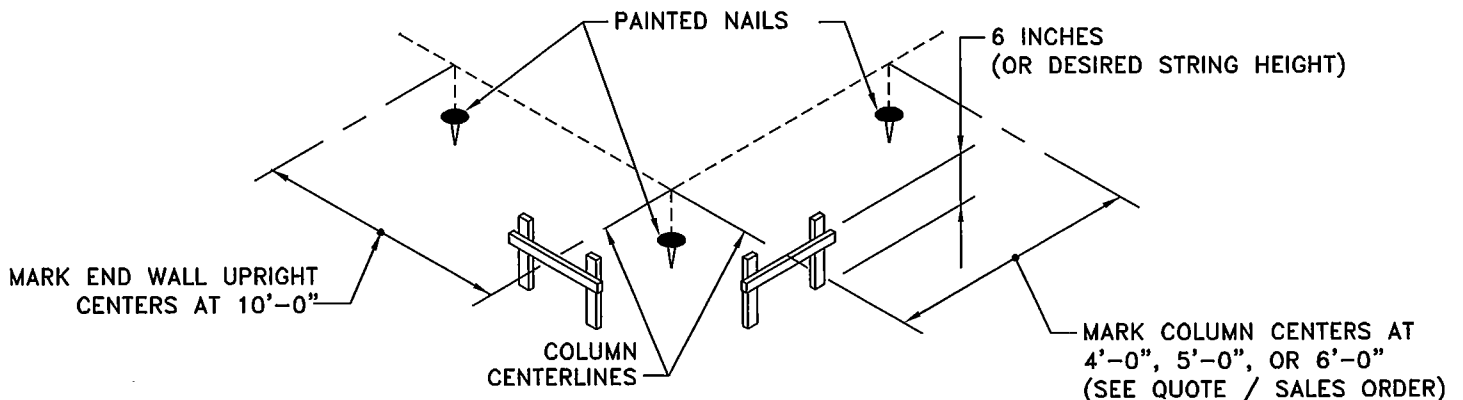


FIGURE 6 - LOCATING COLUMN CENTERS

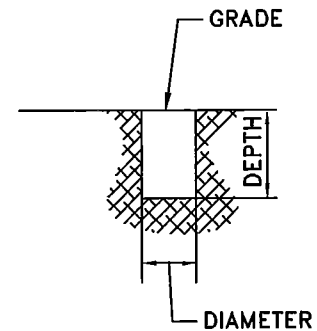
AUGER COLUMN HOLES

1. AT THE POINT THAT THE LINES MEET THE BATTER BOARDS, CLEARLY AND ACCURATELY MARK THE PLACEMENT OF THE LINES. MAKE SURE ALL THE BATTER BOARDS ARE MARKED.
2. REMOVE THE LINES.
3. AUGER THE HOLES DIAMETER AND DEPTH. SEE ENGINEERING DRAWINGS OR CONSULT YOUR LOCAL BUILDING DEPARTMENT FOR HOLE DIMENSIONS.
4. AFTER DIGGING THE HOLES FOR END WALL UP RIGHTS, REFILL LOOSELY WITH DIRT, UNTIL READY FOR USE, (SEE FIGURE 9 - PAGE 7).

CAUTION

BE SURE THERE ARE NO UNDERGROUND OR OVERHEAD ELECTRICAL WIRES, WATER PIPES, GAS LINES, ETC...ON OR NEAR THE JOB SITE.

FIGURE 7 - AUGER HOLE



OFFSETTING THE LINES

1. OFFSETTING OF THE LINES SHOULD BE DONE THE DAY THE CONCRETE IS POURED AND NOT LEFT OVERNIGHT TO PREVENT STRETCHING OR KNOCKING DOWN LINES.
2. TO FIND THE COLUMN SET LINES, YOU MUST RESTORING THE FOUNDATION LAYOUT. FROM THE CENTER LINE MARKS ON THE BATTER BOARDS, MEASURE 1/2 THE SIZE OF THE COLUMN AND MOVE THE LINES TO THAT MARK. (ALWAYS MOVE THE LINES IN THE SAME DIRECTION TO PREVENT CONFUSION AND MISPLACEMENT OF COLUMNS (SEE FIGURE 8).

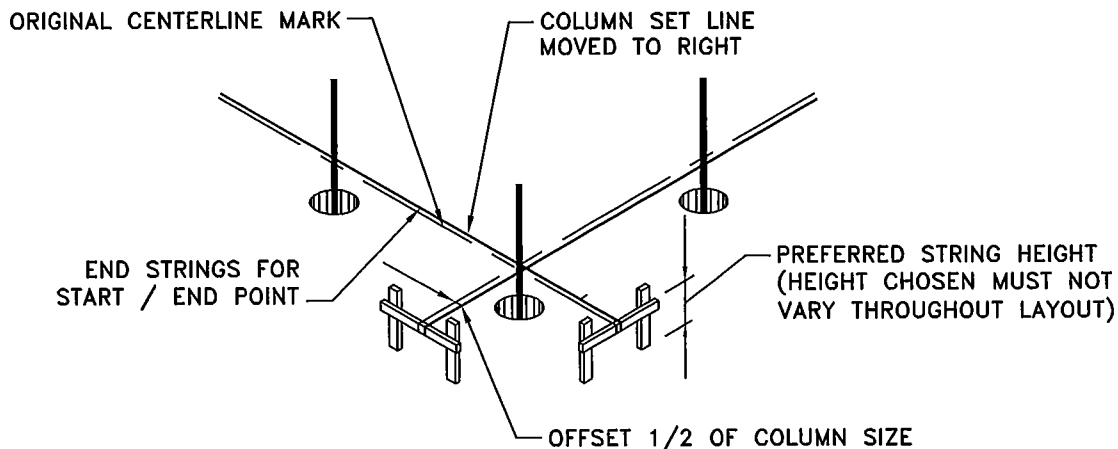
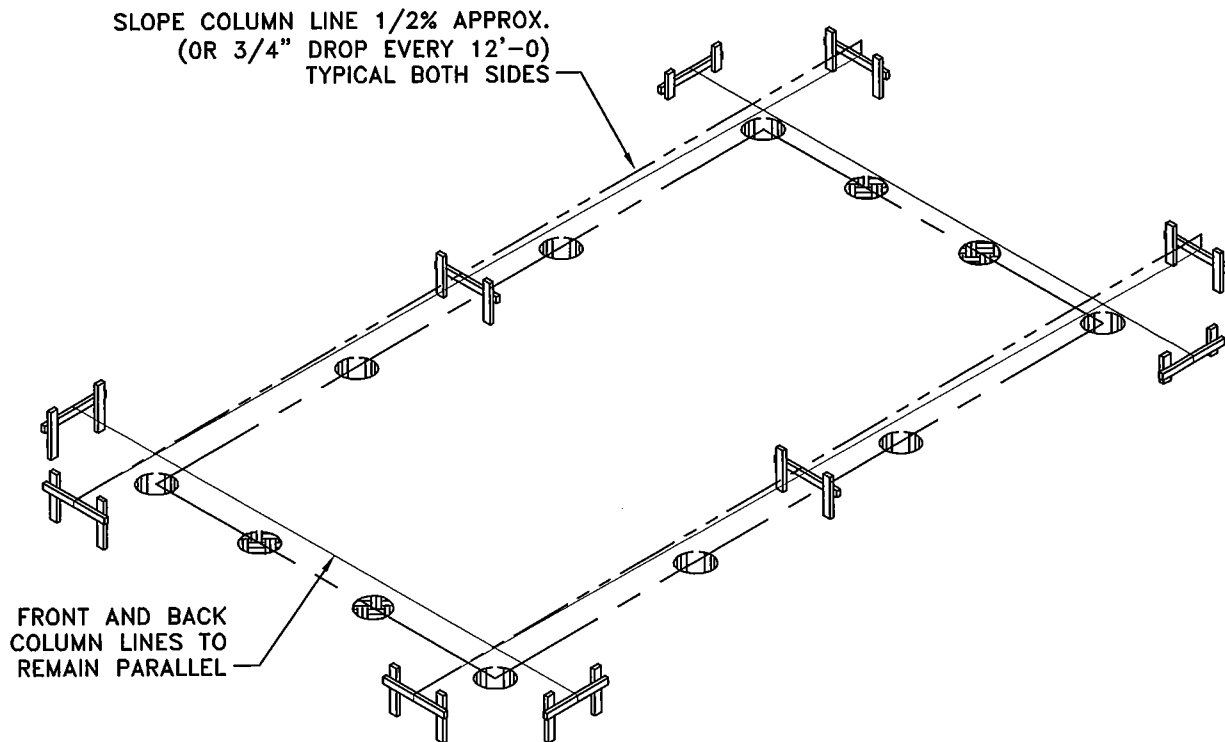


FIGURE 8 - OFFSETTING OF THE COLUMN SET LINES

SLOPE LINES

1. SLOPE THE COLUMN LINES ALONG THE LENGTH OF THE FOUNDATION KEEPING THE FRONT AND BACK COLUMN LINES PARALLEL. THIS WILL INSURE PROPER DRAINAGE 9.



NOTE: THIS TECHNIQUE TO BE USED WITH GUTTER HOUSES ONLY

FIGURE 9 - SLOPING COLUMN LINES

MARK CENTERS ON COLUMNS

1. FROM THE CENTER LINE, MARK ON THE BATTER BOARDS (NOT THE COLUMN SET MARK) THE LENGTH OF LINES, AND MARK THE INTERMEDIATE CENTERS.
2. MARK THE END WALL UPRIGHTS IN THE SAME MANNER. PLEASE NOTE THAT THE OFFSETS FOR END WALL INTERMEDIATE COLUMNS MAY BE DIFFERENT THAN THE OFFSET OF THE SIDE WALL COLUMNS DUE TO THE DIFFERENCE IN COLUMN SIZE. THE CENTER LINES OF COLUMNS MUST BE THE CENTER LINE END WALL COLUMNS.

MARK COLUMNS

1. TO FIND THE ABOVE GROUND COLUMN HEIGHT, MEASURE FROM THE TOP OF THE COLUMN, THIS DISTANCE, AND SUBTRACT THE STRING HEIGHT. MARK THE COLUMN AT THIS POINT WITH A FELT TIP MARKER. CONTINUE WITH REMAINING COLUMNS. (SEE FIGURE 10).

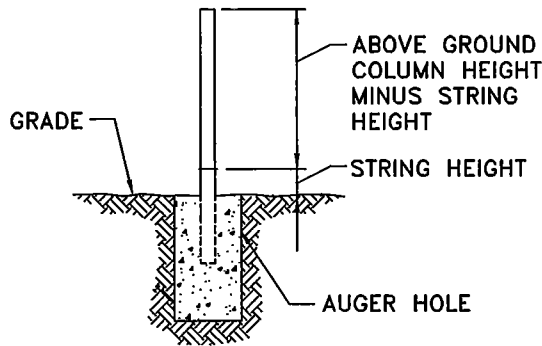
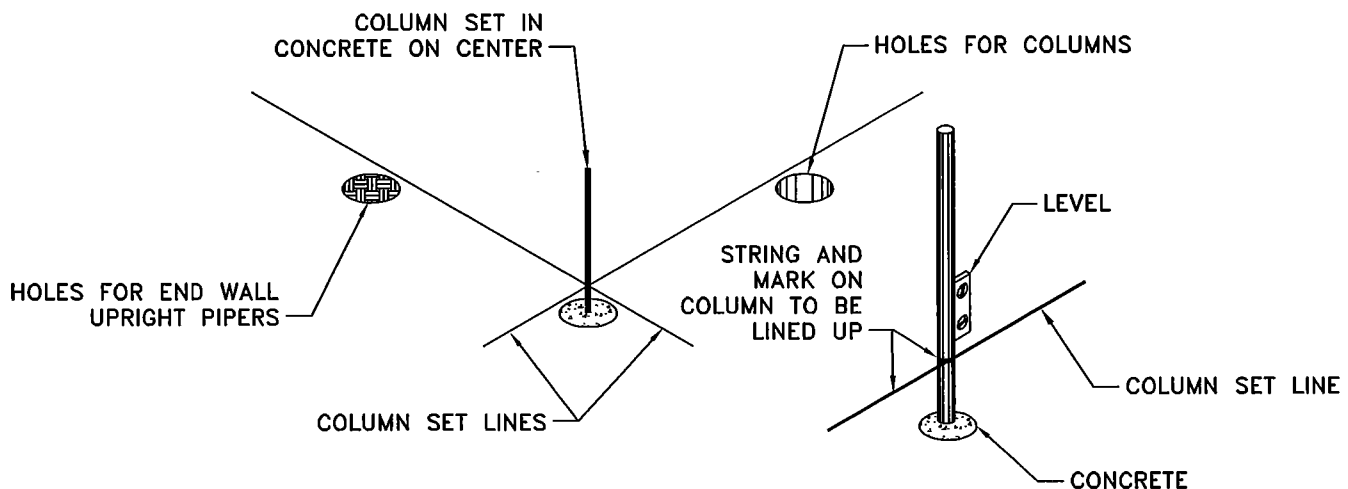


FIGURE 10 - MARKING COLUMNS

SET COLUMNS

1. POUR CONCRETE INTO THE FIRST HOLE. (2) 1/2" SLUMP IS THE MOST POPULAR MIX TO SUPPORT COLUMNS.
2. PUSH THE COLUMN INTO THE CONCRETE AT THE CENTER MARK ON THE STRING (BE SURE THE COLUMN ISN'T ACTUALLY TOUCHING STRING) UNTIL THE MARK ON COLUMN LINES UP WITH THE STRING. THE COLUMN MUST BE PLUMB IN BOTH DIRECTIONS BEFORE MOVING ON TO THE NEXT COLUMN.
3. MOVE ON TO THE NEXT COLUMN, POUR CONCRETE THEN SET THE COLUMN. NEVER POUR ALL THE CONCRETE FIRST THEN GO BACK AND SET COLUMNS, AS THE CONCRETE SETS UP TOO FAST.



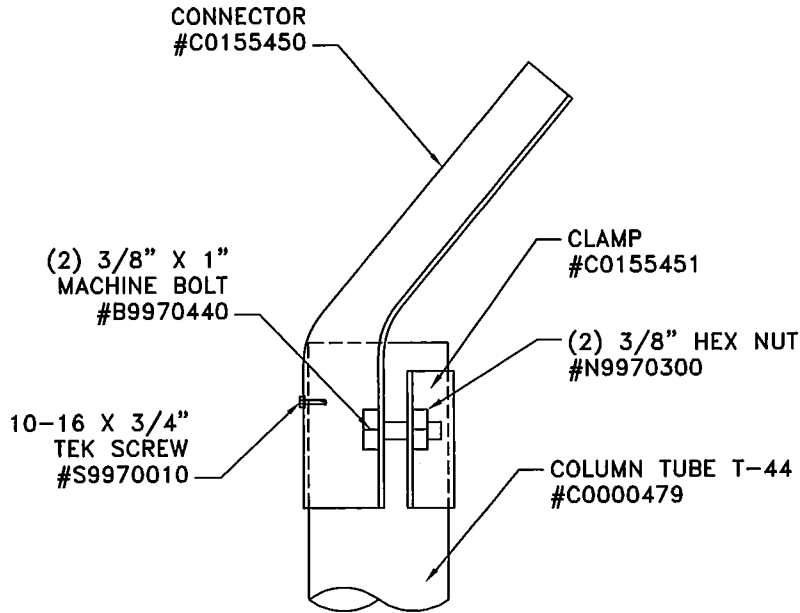
CAUTION:

1. PLACE THE FIRST THREE ARCHES INTO THE FIRST THREE AUGURED HOLES. (SEE PAGE 6 FOR HOLE AUGURING).

FIGURE 11 - SETTING THE COLUMNS

COLUMN TO ARCH CONNECTOR

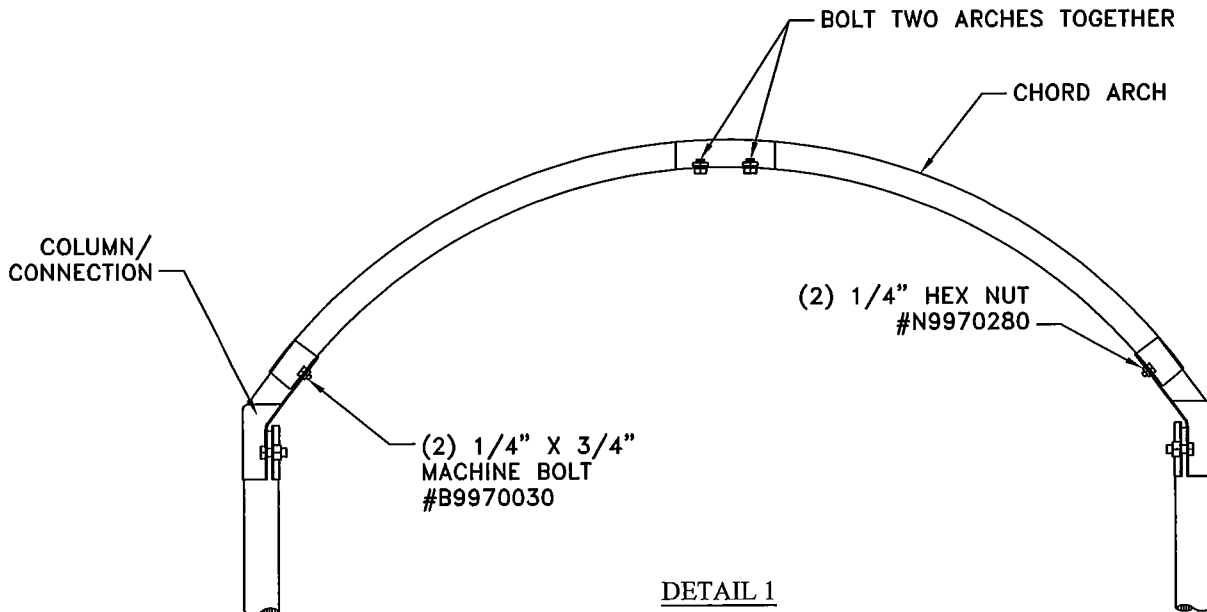
1. ATTACH THE CONNECTOR TO THE COLUMNS USING 1 CLAMP AND (2) 3/8" X 1" MACHINE BOLTS PER CONNECTOR.



DETAIL 1

INSTALLATION OF ARCHES

1. ATTACH THE FIRST ARCH TO THE CONNECTORS USING (4) 1/4 X 3/4" MACHINE BOLTS.



DETAIL 1

ARCH ASSEMBLY

1. TIE OFF THE ARCH USING ROPES OR CABLES TO MAKE THE ARCH PLUMB AND SQUARE. (MATERIALS FOR SECURING THE COLUMNS, ROPE / CABLE, IS NOT SUPPLIED BY CONLEY'S MANUFACTURING SALES).

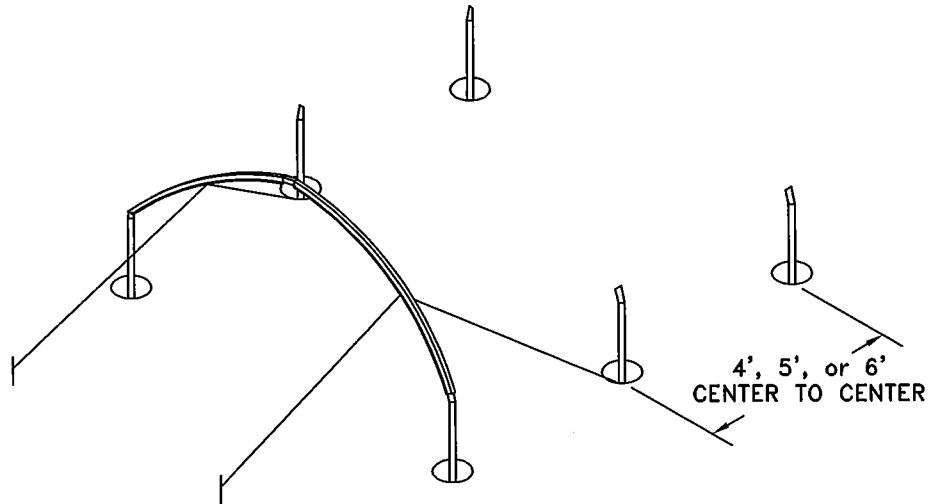


FIGURE 12 - ARCH ASSEMBLY

2. BOLT TWO MORE ARCHES TO THE LEGS USING (4) 1/4" X 1" MACHINE BOLTS PER ARCH.

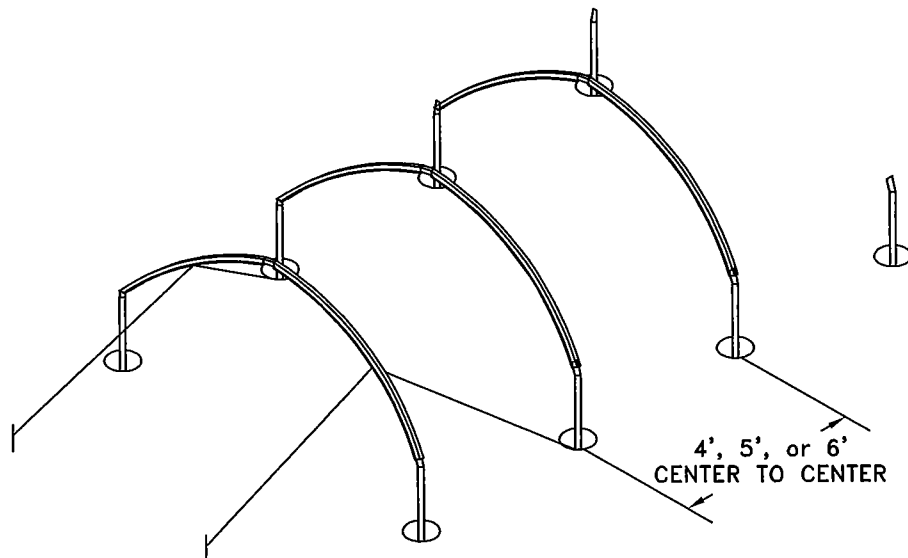
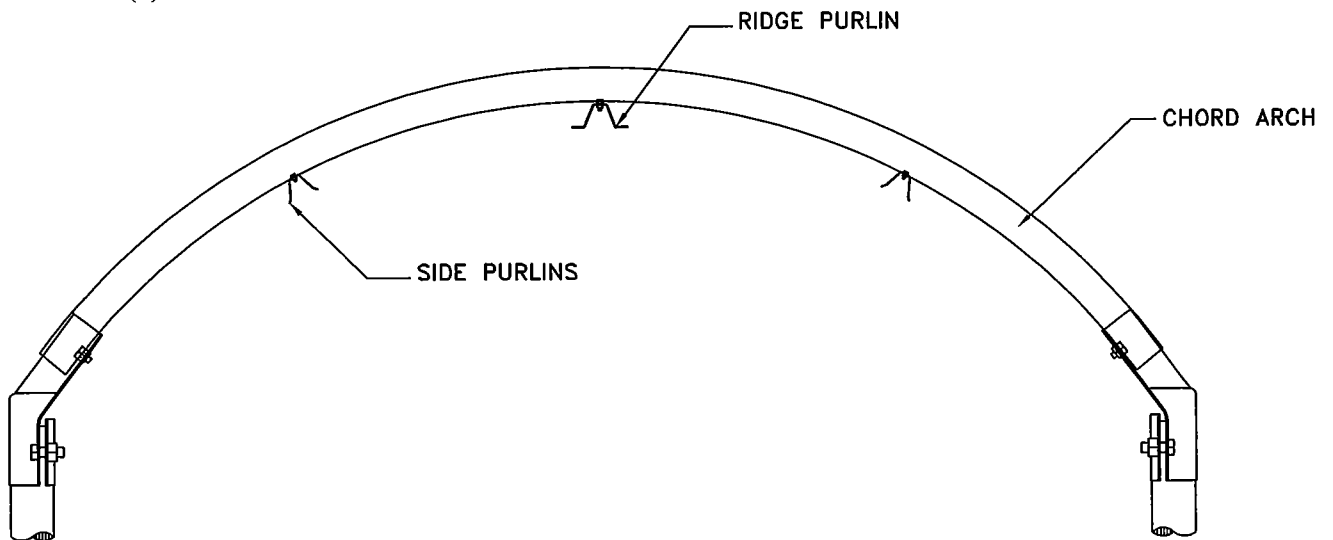


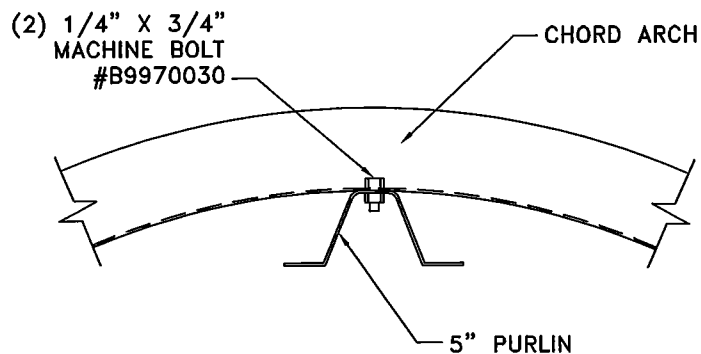
FIGURE 12 - ARCH ASSEMBLY

PURLIN INSTALLATION

1. BOLT THE RIDGE PURLIN TO THE UNDERSIDE OF THE FIRST AND SECOND ARCHES USING (2) 1/4" X 3/4" MACHINE BOLTS PER ARCH.

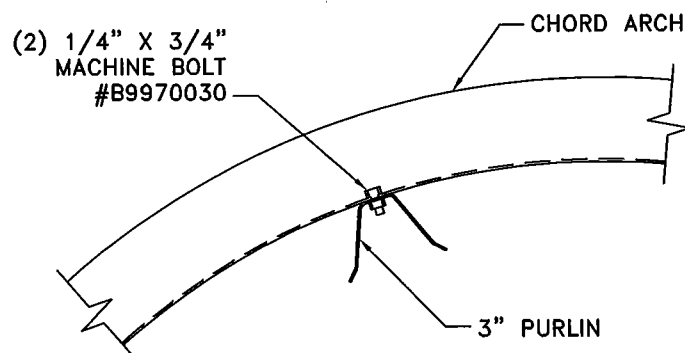


2. BOLT ON THE QUARTER POINT PURLINS TO THE FIRST AND SECOND ARCHES USING (2) 1/4" X 3/4" MACHINE BOLTS PER ARCH.



3. ATTACH TWO MORE ARCHES. OVERLAP THE RIDGE PURLIN AT THE THIRD ARCH AND BOLT IT TO THE THIRD AND FOURTH ARCHES WITH (2) 1/4" X 3/4" MACHINE BOLTS PER ARCH.

4. OVERLAP THE QUARTER POINT PURLINS AT THE THIRD ARCH AND BOLT THEM TO THE THIRD AND FOURTH ARCHES. (SEE NOTE 1 FOR BOLT INFORMATION).



INSTALL REMAINING ARCHES AND PURLINS

1. INSTALL THE REMAINING ARCHES, TWO AT A TIME, UNTIL THE FULL LENGTH OF THE BUILDING IS COMPLETE.

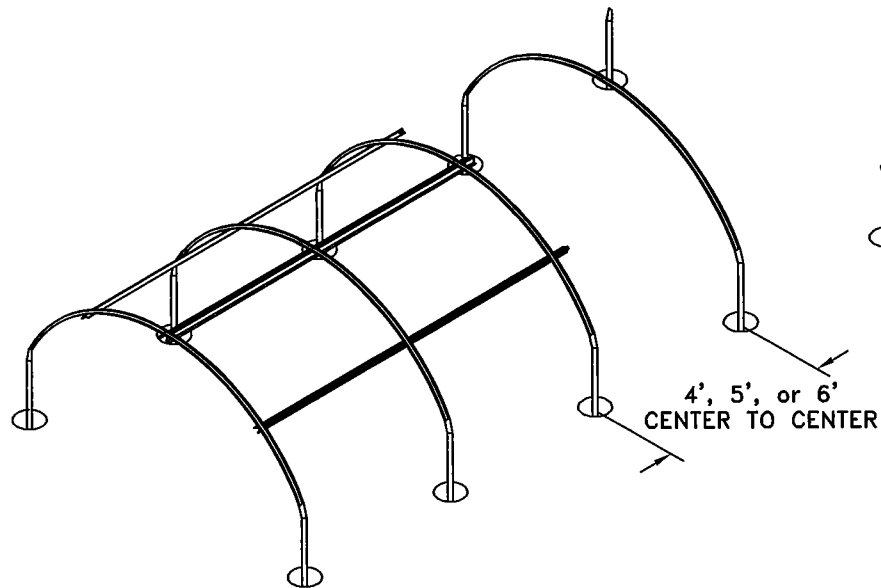


FIGURE 14 - INSTALLING THE REMAINING PURLINS

INSTALL "X" BRACING

1. BRACE STRAPS ARE INSTALLED AT EACH END OF THE BUILDING IN THE SECOND BAY. ADJUST THE ARCHES UNTIL THEY ARE PLUMB AND SQUARE.
2. TRIM IF NEEDED.

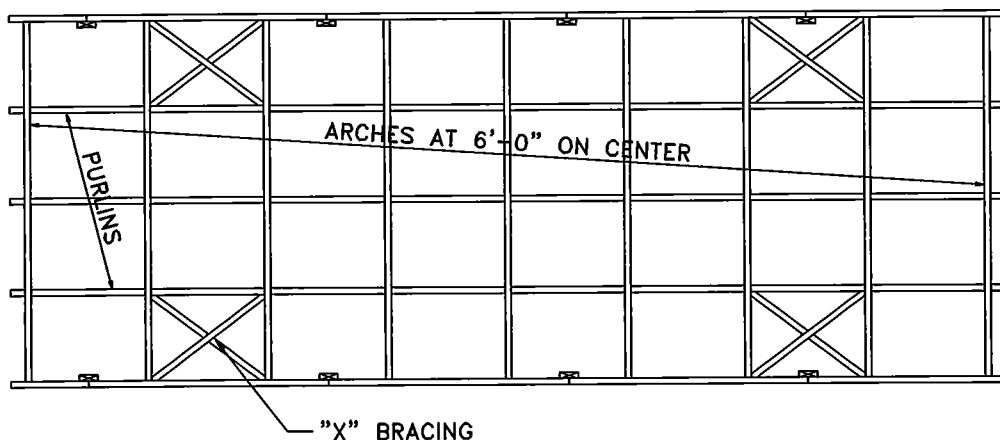
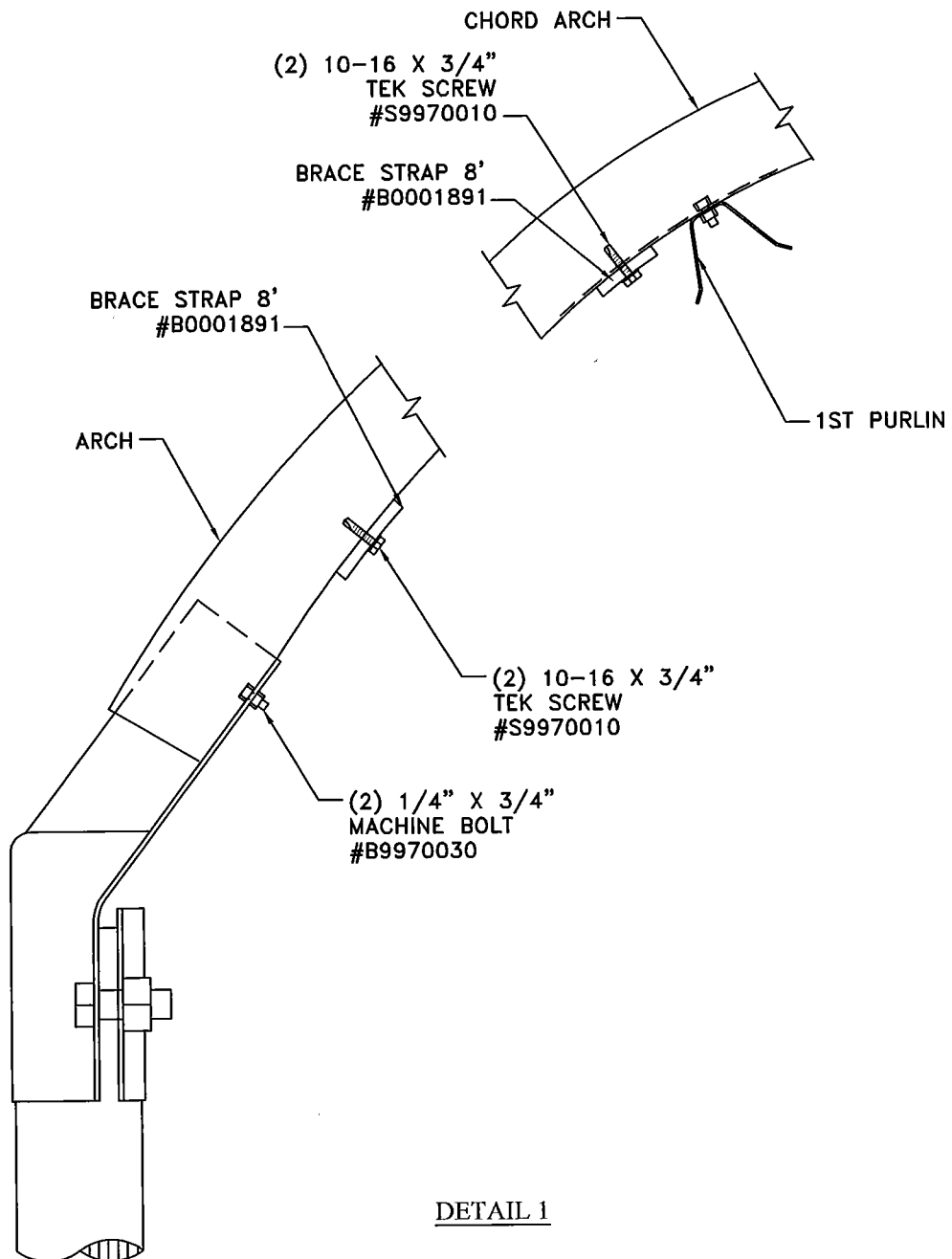


FIGURE 15 - "X" BRACING

3. USING (1) 10-16 X 3/4" SCREW AT EACH END OF THE BRACE STRAP, SCREW ONE END AT THE END OF THE SECOND ARCH AND THE OPPOSITE END TO THE UNDERSIDE OF THE THIRD ARCH BELOW THE QUARTER POINT PURLIN.
4. SCREW ON THE SECOND STRAP THE SAME WAY AS THE FIRST SO THAT THE STRAPS FORM AN "X". REPEAT THIS AT THE REMAINING THREE LOCATIONS IN BUILDING.



2 X 4 GIRT INSTALLATION

1. ATTACH THE 2 X 4 GIRT TO THE COLUMN AND 2 X 4 SPLICE AS SHOWN BELOW.

NOTE: CONLEY'S MFG. DOES NOT SUPPLY ANY LUMBER - THE CUSTOMER MUST PURCHASE ALL LUMBER AND NAILS.

2. IF YOU HAVE PURCHASED THE PIPE CLAMP AND HARDWARE FROM CONLEY'S MFG., THEN YOU NEED TO DRILL A 5/16" HOLE FOR A 1/4" X 2" CARRIAGE BOLT 2 1/2" FROM THE END OF THE GIRT FOR A 2 7/8" COLUMN OR 1 1/2" FROM THE END FOR A 1 5/8" COLUMN.

NOTE:

THIS DRAWING IS FOR REFERENCE ONLY!!! CONLEY'S MFG. ONLY SUPPLIES THE CLAMP ASSEMBLY WHEN ORDERED BY THE CUSTOMER. ALL OTHER MATERIAL MUST BE SUPPLIED BY THE CUSTOMER.

IF THE KOOL CEL DISTRIBUTION SYSTEM IS BEING INSULATED, CHECK THE KOOL CEL INSTRUCTION MANUAL FOR PROPER SLOPE AND DISTANCE TO INSTALL END WALL OR SIDE WALL GIRTS.

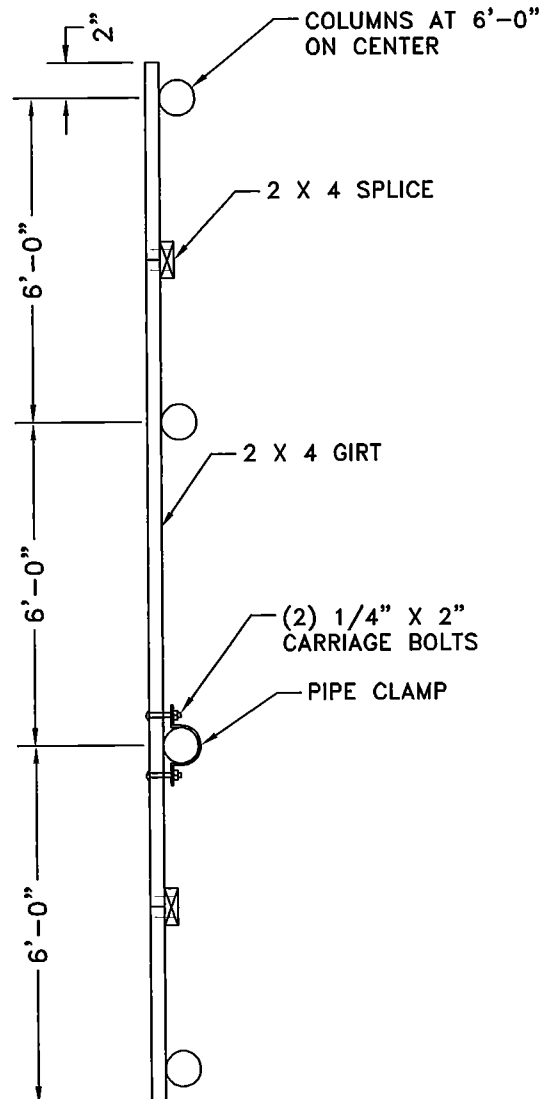


FIGURE 16 - GIRT INSTALLATION

DOOR END WALL WITH METAL GIRTS

1. DIG HOLES AT THE CENTER LINE OF JAMBS. THE DISTANCE BETWEEN THE JAMBS IS DETERMINED BY THE DOORS WIDTH.

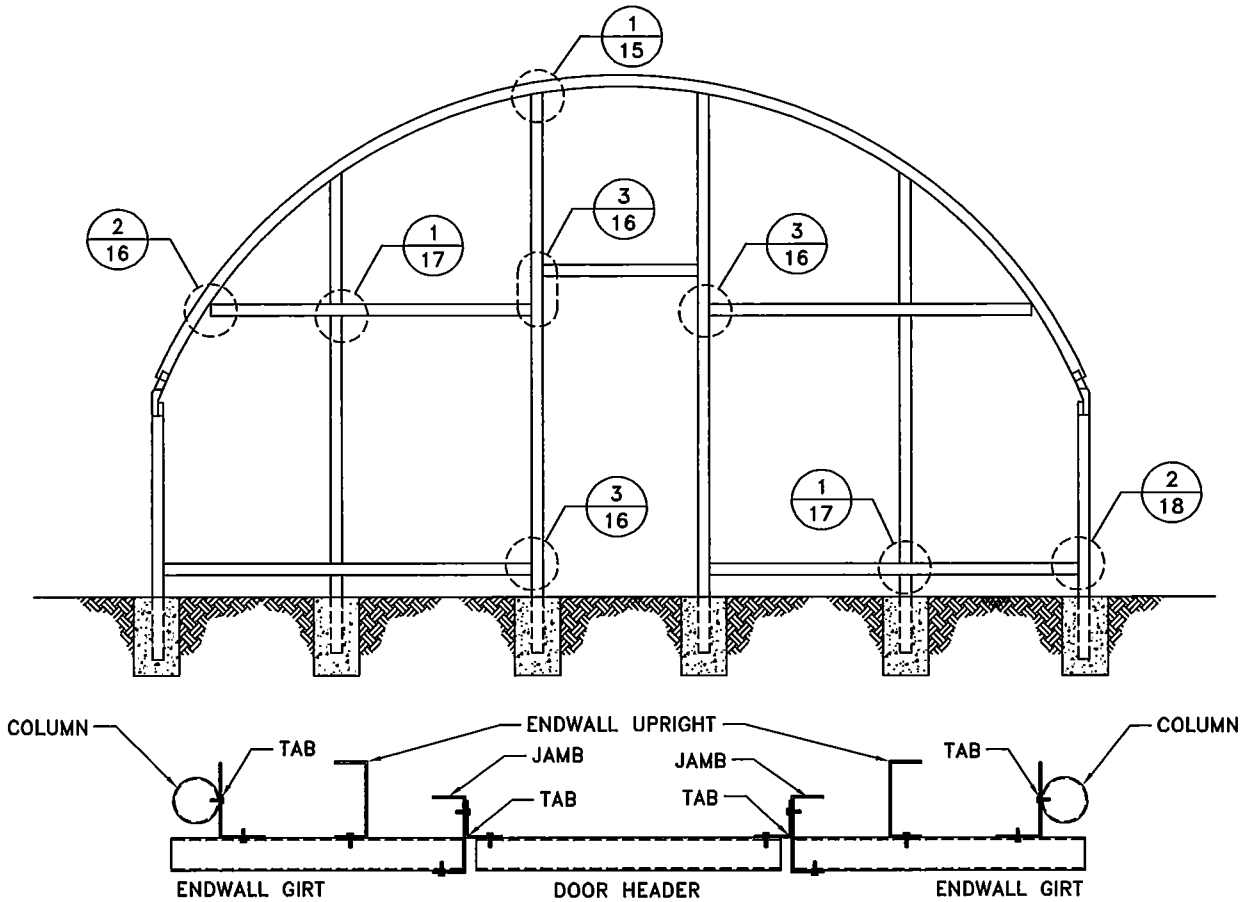
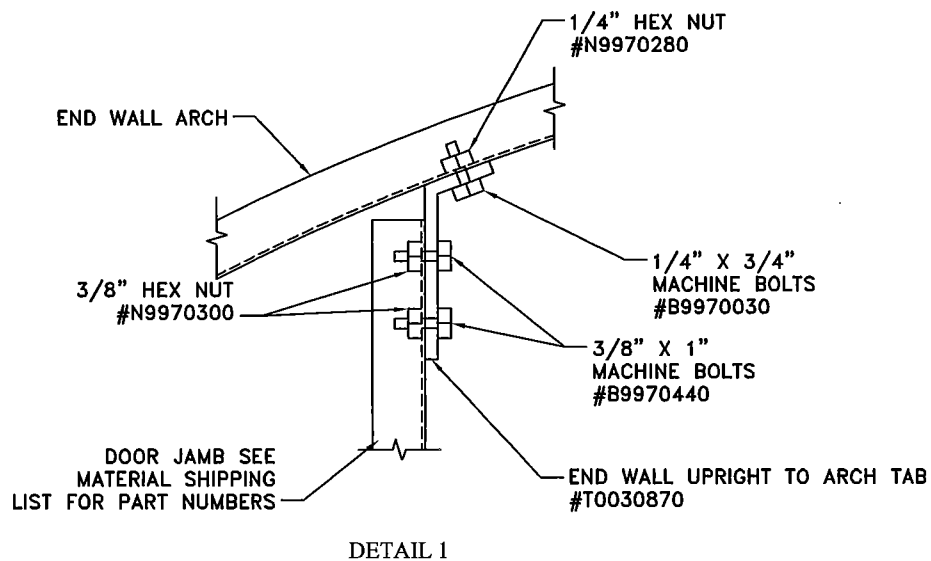
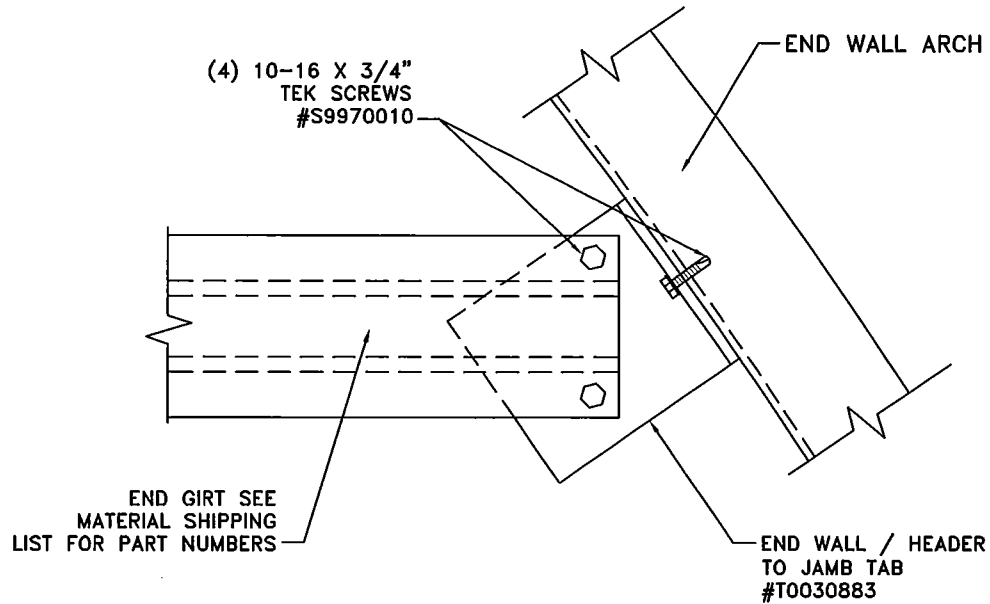


FIGURE 17 - END WALL DOOR FRAME

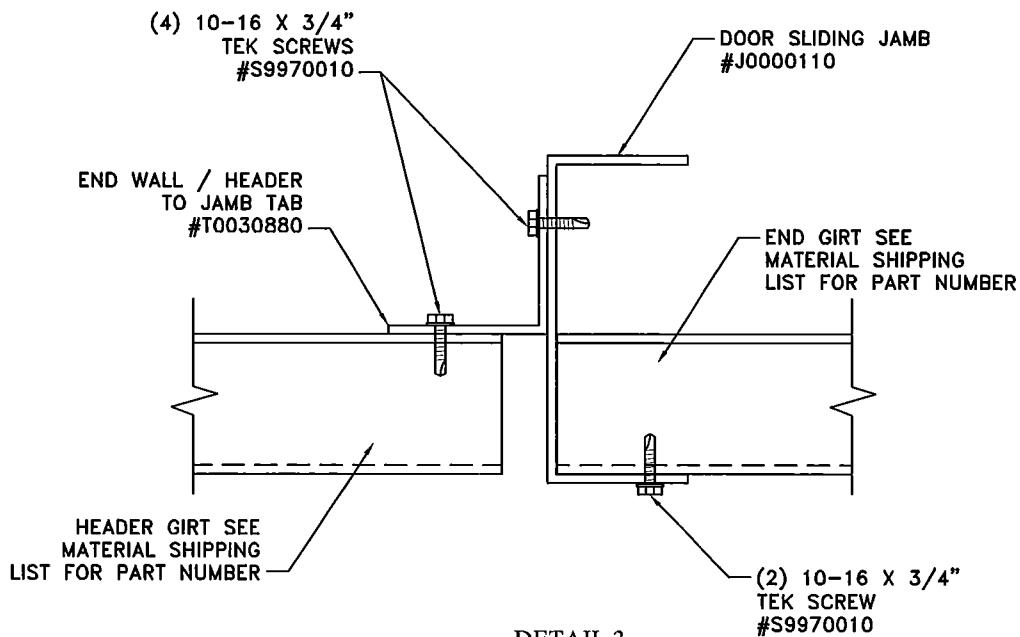
2. ATTACH THE END WALL UPRIGHTS TO THE ARCH TAB WITH (2) 1/4" X 3/4" MACHINE BOLTS.
3. STAND THE DOOR JAMBS IN THE HOLES AND ATTACH IT TO THE TOP OF THE JAMB AND TO THE PREVIOUSLY INSTALLED TAB. ALIGN THE JAMB FLUSH WITH THE OUTSIDE EDGE OF THE ARCH AND CONNECT IT TO THE TAB WITH (2) 3/8" X 1" MACHINE BOLT.



4. PLUMB JAMBS IN BOTH DIRECTIONS AND CEMENTS THE HOLES OR FILL THEM WITH CRUSHED ROCK DEPENDING ON YOUR BUILDING. (SEE PAGE 14 FOR INFORMATION).
5. DRILL SCREW THE END WALL / HEADER JAMB TAB TO THE END WALL ARCH, JAMBS, AND AT THE HEADER WITH (2) 10-16 X 3/4" TEK SCREWS. (SEE PAGE 15 FOR TAB / GIRT / HEADER LOCATIONS).
6. LEVEL AND DRILL SCREW THE END GIRTS TO THE TABS AND INSIDE OF DOOR JAMBS WITH (2) 10-16 X 3/4" TEK SCREWS AT TAB JAMBS.



DETAIL 2



DETAIL 3

SOLID END WALL WITH METAL GIRTS

1. FOLLOW DIRECTIONS 1 THROUGH 5 ON PAGES 15 AND 16 FOR END WALL INSTALLATION.

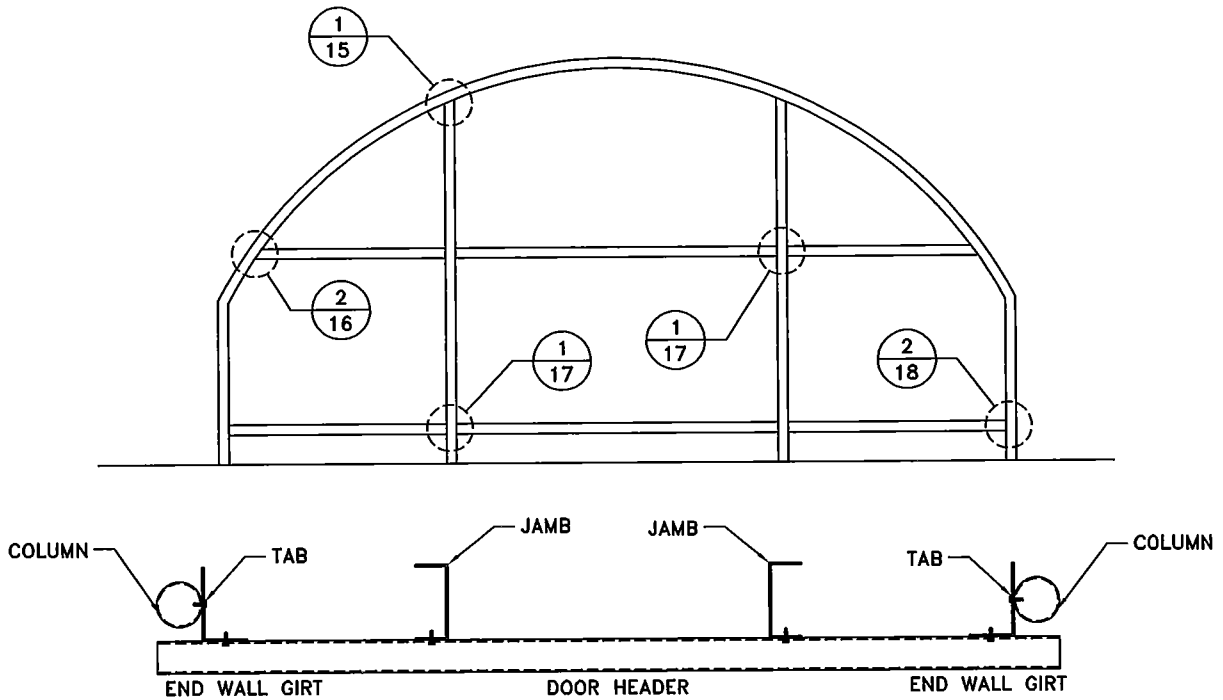
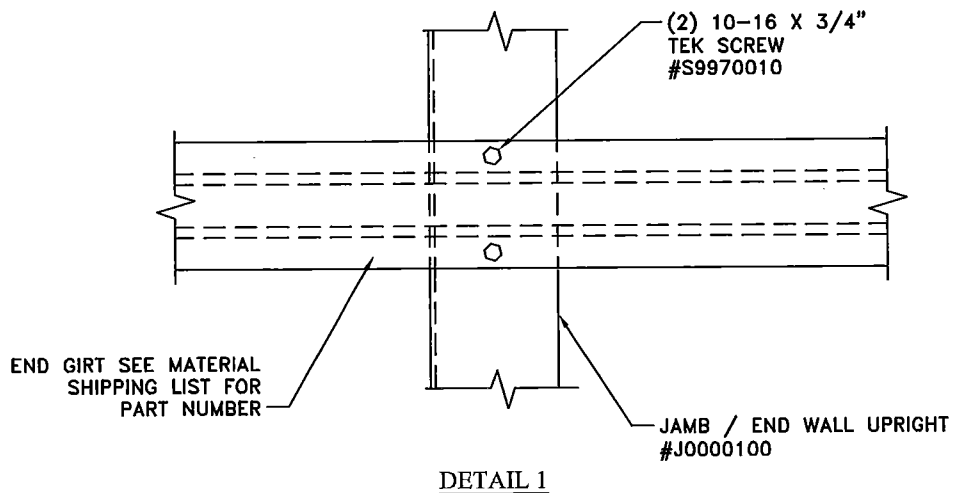
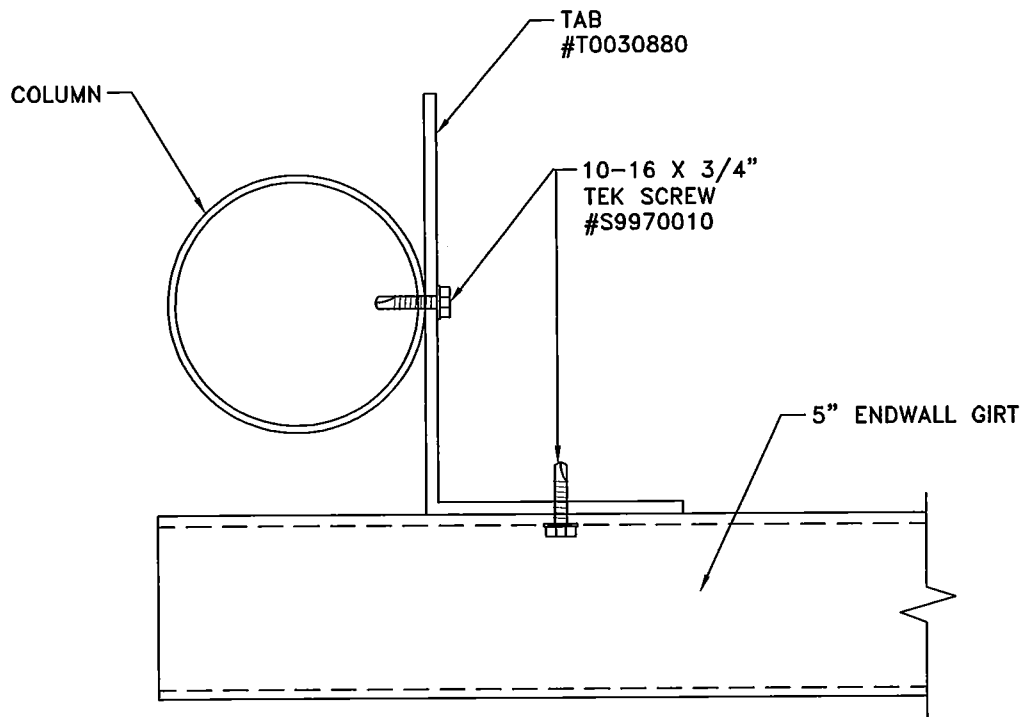


FIGURE 18 - SOLID END WALL

2. LEVEL AND DRILL SCREW THE END GIRTS TO THE TABS WITH (2) 10-16 X 3/4" TEK SCREWS AT EACH TAB. REFER TO PAGE 19 FOR GIRT AND END WALL UPRIGHT LOCATIONS.
3. SECURE THE END GIRTS TO THE END WALL UPRIGHTS WITH (2) 10-16 X 3/4" TEK SCREWS. (SEE DETAIL 3 BELOW).

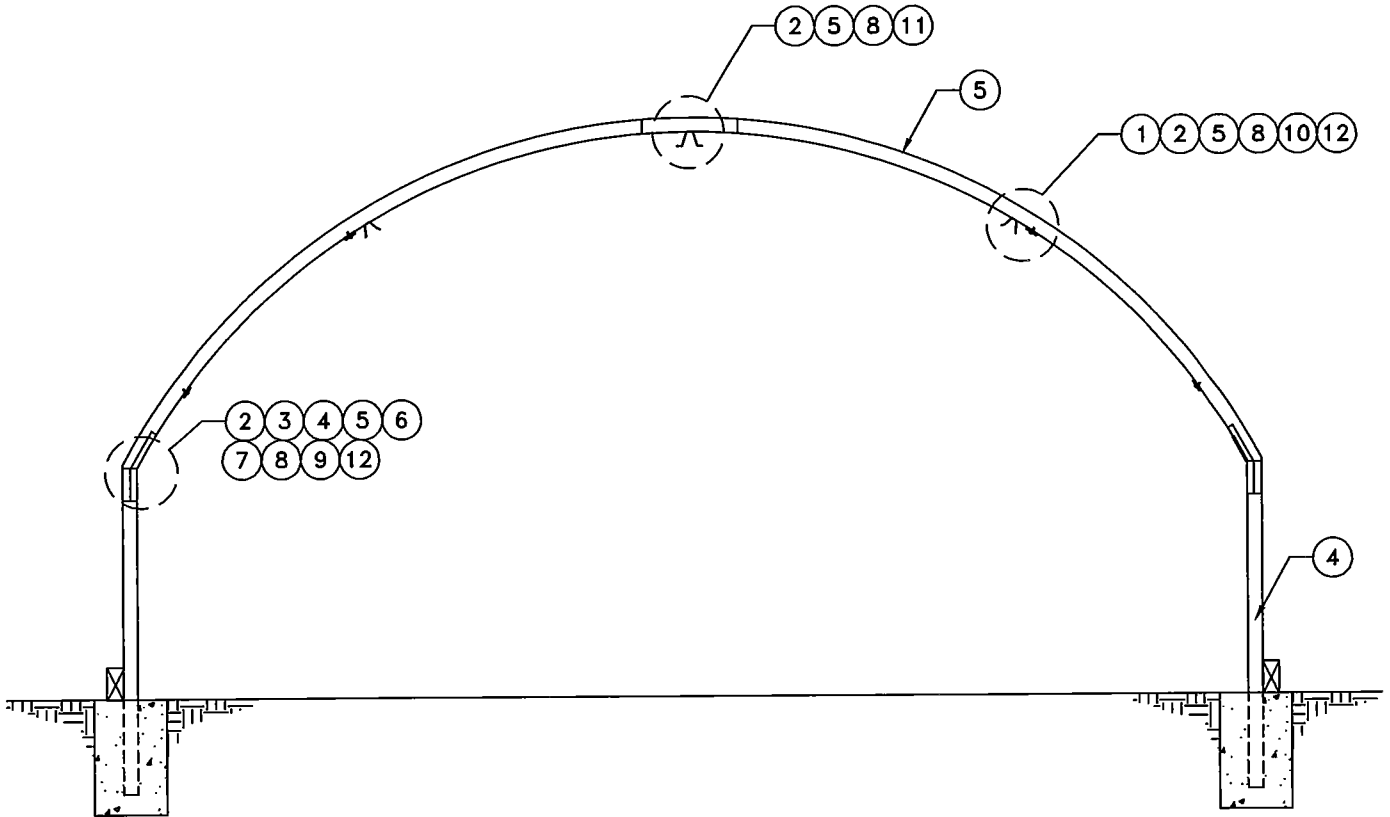


DETAIL 1



DETAIL 2

20' COLD FRAME WITH LEGS ARCH PARTS LIST

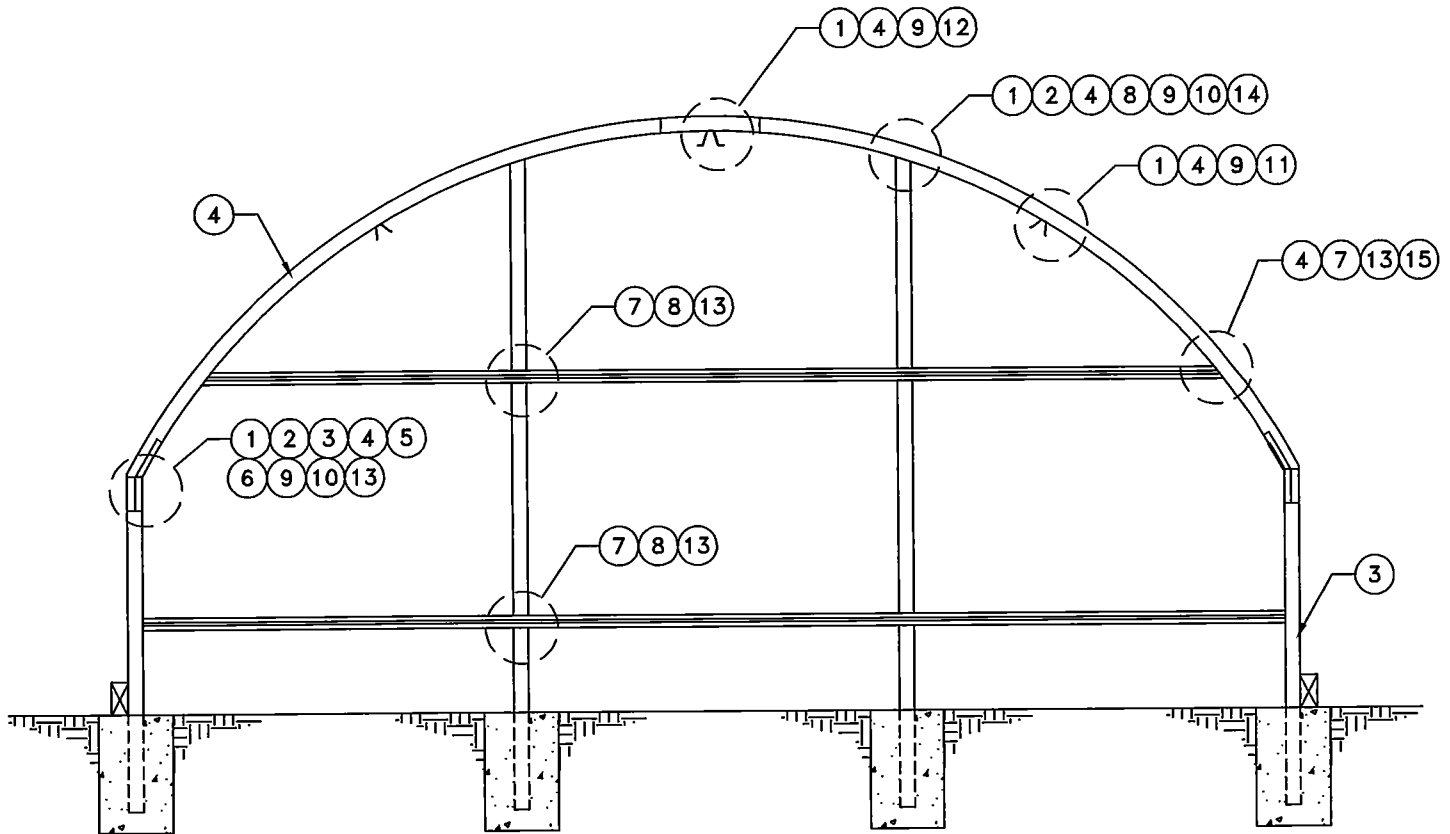


PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	4	B0001891	BRACE STRAP 8'-0"
2	14	B9970030	BOLT/HH 1/4" X 3/4" GRADE 5
3	4	B9970440	BOLT/HH 3/8" X 1"
4	2	C0000479	COLUMN TUBE T-44 1 5/8" X 5'-3"
5	2	C0055350	CHORD ARCH 154" R
6	2	C0155450	CONN COLUMN TO ARCH HAND (5" ARCH)
7	2	CO155451	CONN COLUMN TO ARCH CLAMP
8	14	N9970280	NUT HEX PLTD COARSE 1/4"
9	4	N9970300	NUT HEX PLTD COARSE 3/8"
10	2	P0001715	PURLIN 3" X 12'-4" SIDES
11	1	P0001840	PURLIN 5" X 12'-4" UNDER RIDGE
12	2	S9970010	10-16 X 3/4" TEK SCREW

FIGURE 19 - 20 ARCH PARTS LIST

20' COLD FRAME WITH LEGS END WALL PARTS LIST

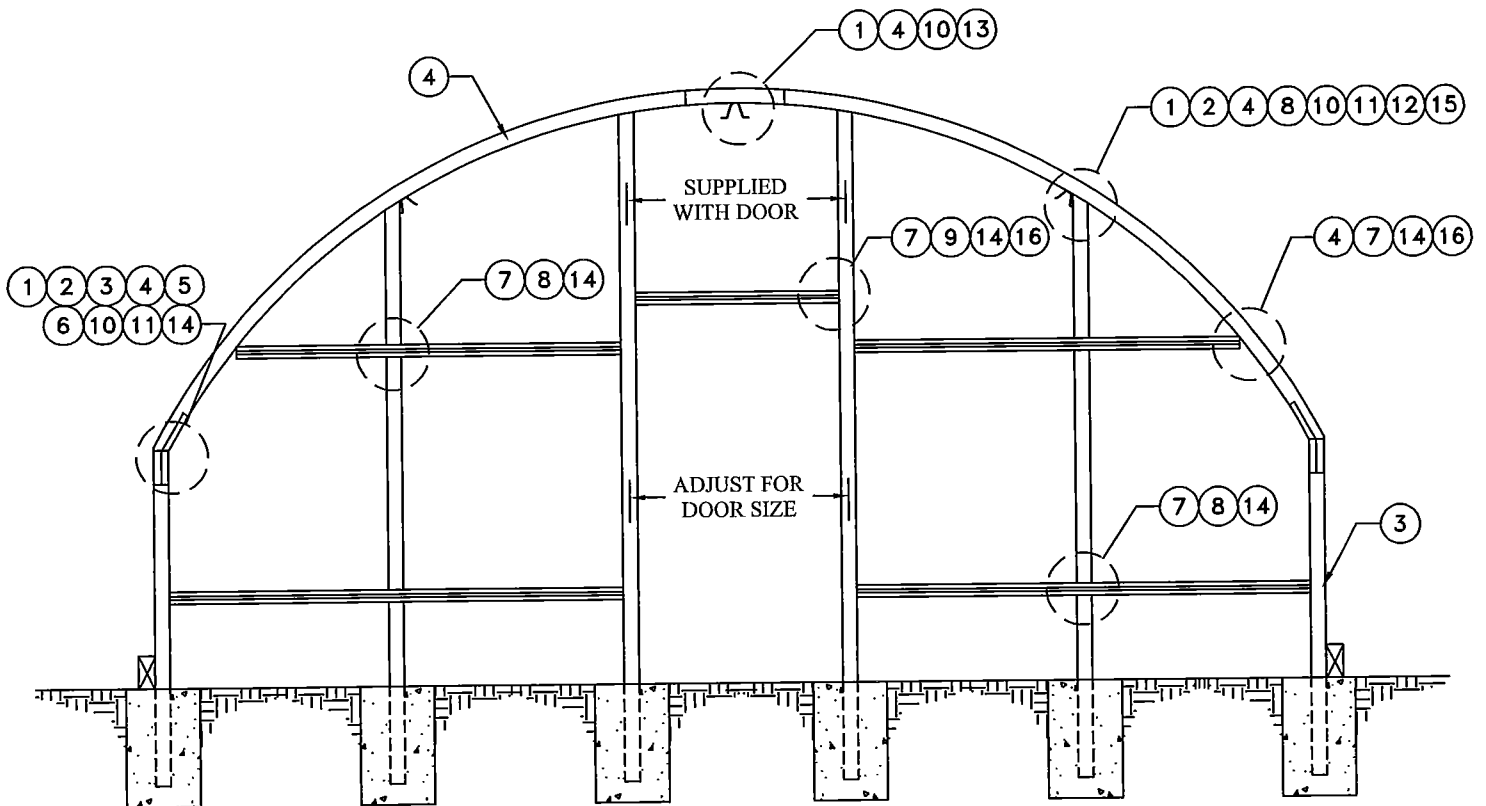


PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	16	B9970030	BOLT/HH 1/4" X 3/4" GRADE 5
2	8	B9970440	BOLT/HH 3/8" X 1"
3	2	C0000479	COLUMN TUBE T-44 1 5/8" X 5'-3"
4	2	C0055350	CHORD ARCH 154" R
5	2	C0155450	CONN COLUMN TO ARCH HAND (5" ARCH)
6	2	CO155451	CONN COLUMN TO ARCH CLAMP
7	2	G0000200	GIRT 5" X 20'
8	2	J0000100	SLIDING DOOR JAMB 10'
9	16	N9970280	NUT HEX PLTD COARSE 1/4"
10	8	N9970300	NUT HEX PLTD COARSE 3/8"
11	2	P0001715	PURLIN 3" X 12'-4" SIDES
12	1	P0001840	PURLIN 5" X 12'-4" UNDER RIDGE
13	24	S9970010	10-16 X 3/4" TEK SCREW
14	2	T0030870	TAB END WALL UPRIGHT
15	4	T0030880	TAB END WALL / HEADER TO JAMB

FIGURE 20 - (20'-0" END WALL PARTS LIST)

20' COLD FRAME WITH LEGS END WALL WITH DOOR PARTS LIST

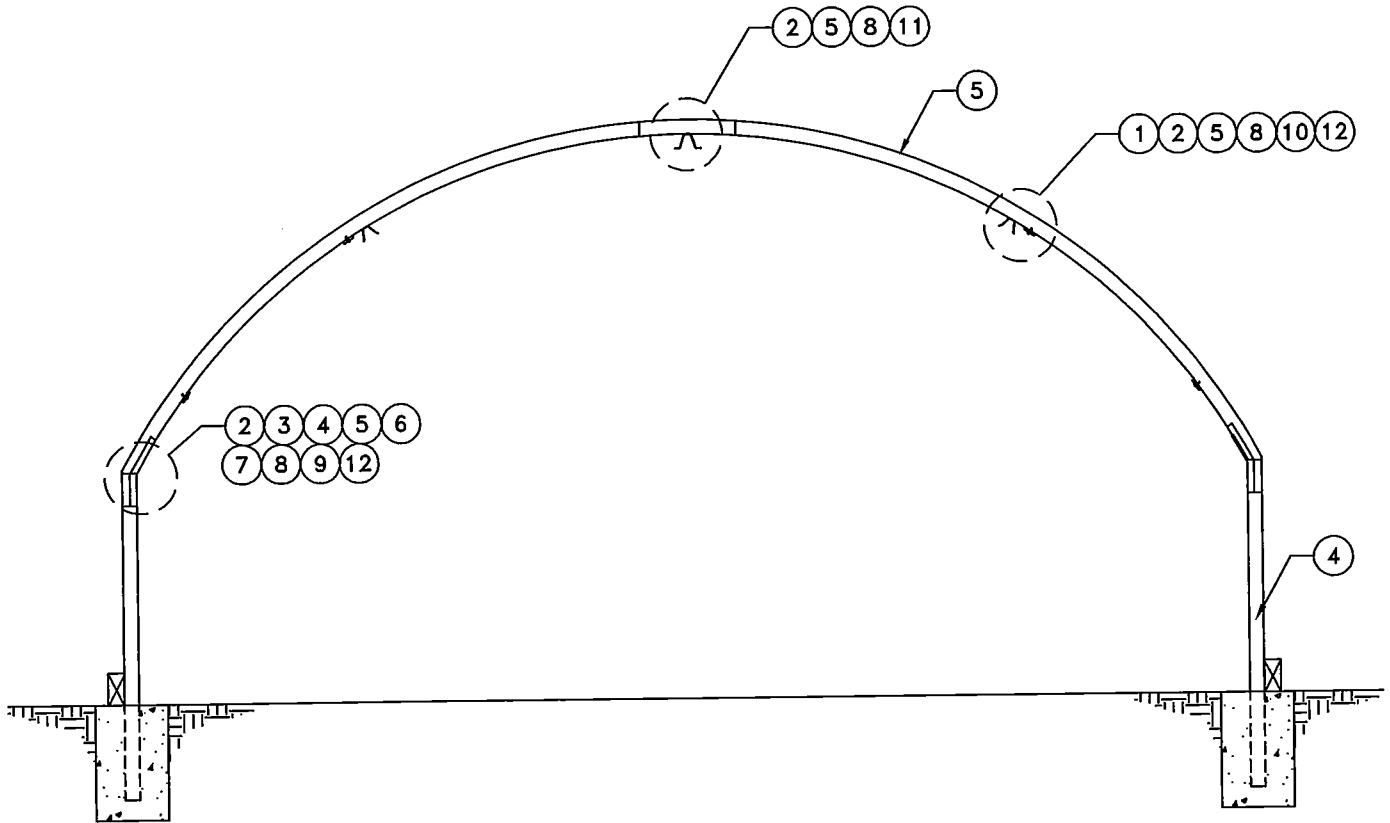


PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	16	B9970030	BOLT/HH 1/4" X 3/4" GRADE 5
2	8	B9970440	BOLT/HH 3/8" X 1"
3	2	C0000479	COLUMN TUBE T-44 1 5/8" X 5'-3"
4	2	C0055350	CHORD ARCH 154" R
5	2	C0155450	CONN COLUMN TO ARCH HAND (5" ARCH)
6	2	CO155451	CONN COLUMN TO ARCH CLAMP
7	2	G0000200	GIRT 5" X 20'
8	2	J0000100	SLIDING DOOR JAMB 10'
9	2	J0000110	SLIDING DOOR JAMB 12'
10	16	N9970280	NUT HEX PLTD COARSE 1/4"
11	8	N9970300	NUT HEX PLTD COARSE 3/8"
12	2	P0001715	PURLIN 3" X 12'-4" SIDES
13	1	P0001840	PURLIN 5" X 12'-4" UNDER RIDGE
14	24	S9970010	10-16 X 3/4" TEK SCREW
15	4	T0030870	TAB END WALL UPRIGHT
16	10	T0030880	TAB END WALL / HEADER TO JAMB

FIGURE 21 - (20'-0" END WALL WITH DOOR PARTS LIST)

24' COLD FRAME WITH LEGS ARCH PARTS LIST

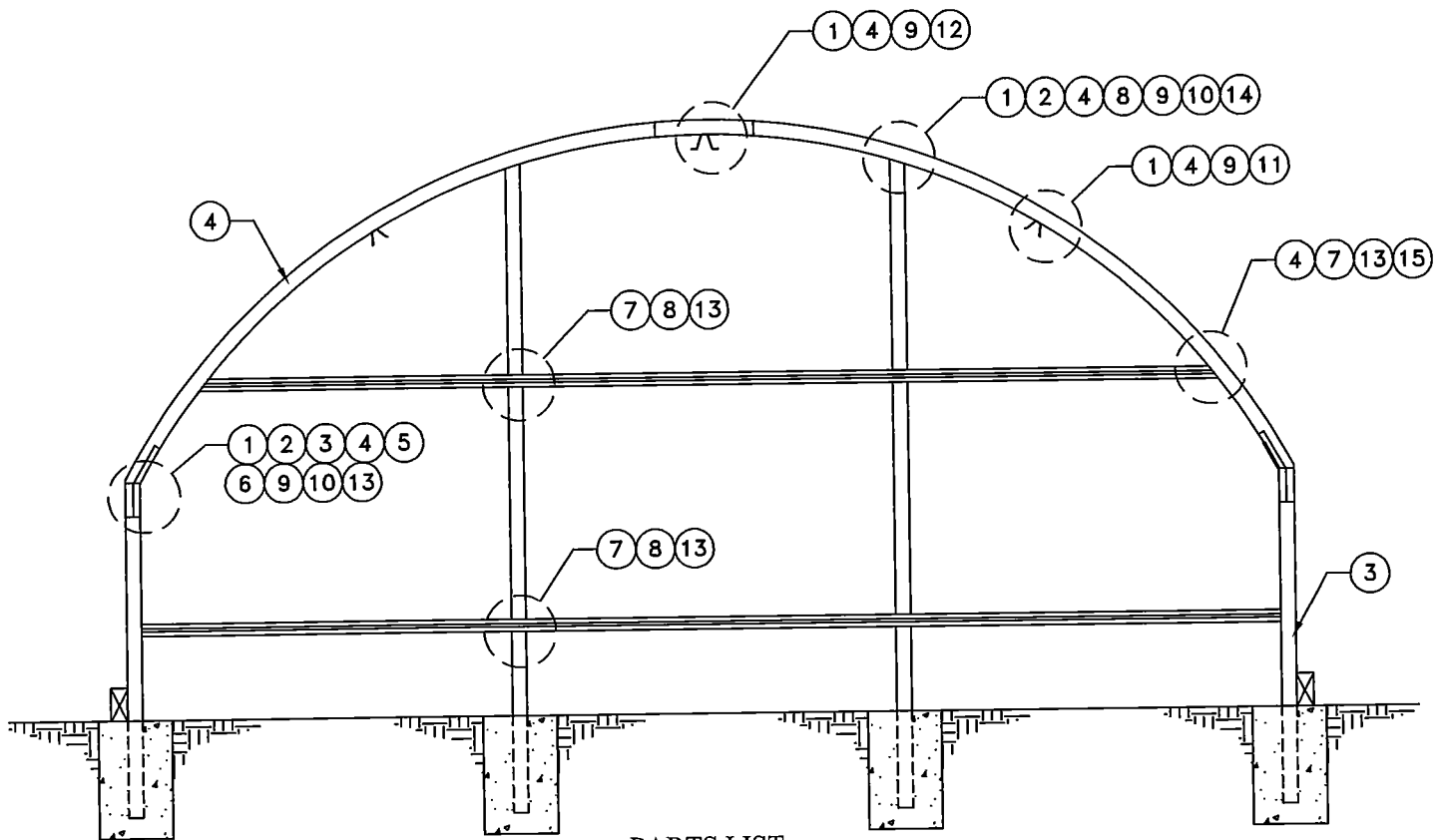


PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	4	B0001891	BRACE STRAP 8'-0"
2	14	B9970030	BOLT/HH 1/4" X 3/4" GRADE 5
3	4	B9970440	BOLT/HH 3/8" X 1"
4	2	C0000479	COLUMN TUBE T-44 1 5/8" X 5'-3"
5	2	C0055356	CHORD ARCH 190" R
6	2	C0155450	CONN COLUMN TO ARCH HAND (5" ARCH)
7	2	CO155451	CONN COLUMN TO ARCH CLAMP
8	14	N9970280	NUT HEX PLTD COARSE 1/4"
9	4	N9970300	NUT HEX PLTD COARSE 3/8"
10	2	P0001715	PURLIN 3" X 12'-4" SIDES
11	1	P0001840	PURLIN 5" X 12'-4" UNDER RIDGE
12	2	S9970010	10-16 X 3/4" TEK SCREW

FIGURE 22 - (24'-0" ARCH PARTS LIST)

24' COLD FRAME WITH LEGS END WALL PARTS LIST

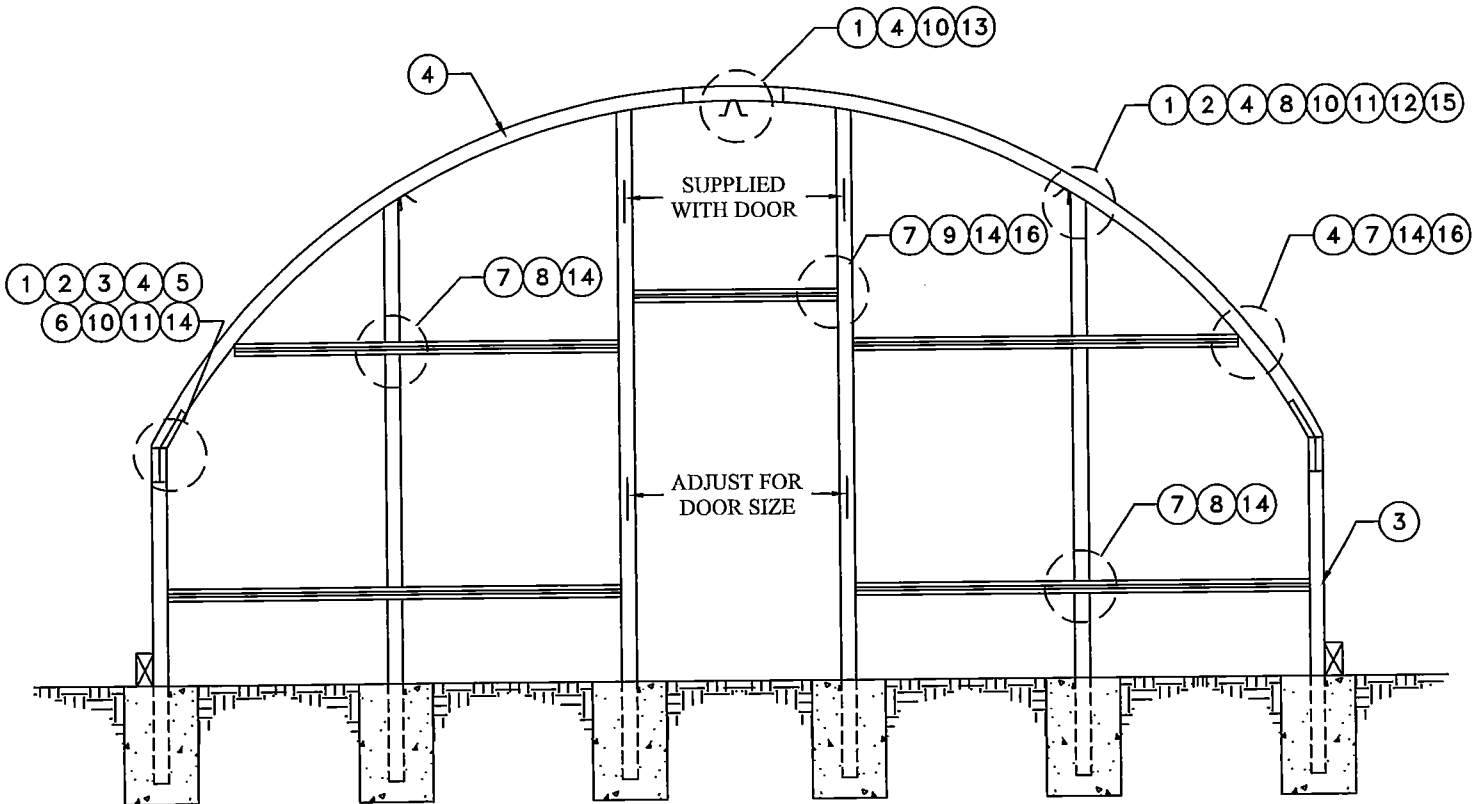


PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	16	B9970030	BOLT/HH 1/4" X 3/4" GRADE 5
2	8	B9970440	BOLT/HH 3/8" X 1"
3	2	C0000479	COLUMN TUBE T-44 1 5/8" X 5'-3"
4	2	C0055356	CHORD ARCH 190" R
5	2	C0155450	CONN COLUMN TO ARCH HAND (5" ARCH)
6	2	CO155451	CONN COLUMN TO ARCH CLAMP
7	2	G0000200	GIRT 5" X 20'
8	2	J0000100	SLIDING DOOR JAMB 10'
9	16	N9970280	NUT HEX PLTD COARSE 1/4"
10	8	N9970300	NUT HEX PLTD COARSE 3/8"
11	2	P0001715	PURLIN 3" X 12'-4" SIDES
12	1	P0001840	PURLIN 5" X 12'-4" UNDER RIDGE
13	24	S9970010	10-16 X 3/4" TEK SCREW
14	2	T0030870	TAB END WALL UPRIGHT
15	4	T0030880	TAB END WALL / HEADER TO JAMB

FIGURE 22 - (24'-0" END WALL PARTS LIST)

24' COLD FRAME WITH LEGS END WALL WITH DOOR PARTS LIST



PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	16	B9970030	BOLT/HH 1/4" X 3/4" GRADE 5
2	8	B9970440	BOLT/HH 3/8" X 1"
3	2	C0000479	COLUMN TUBE T-44 1 5/8" X 5'-3"
4	2	C0055356	CHORD ARCH 190" R
5	2	C0155450	CONN COLUMN TO ARCH HAND (5" ARCH)
6	2	CO155451	CONN COLUMN TO ARCH CLAMP
7	2	G0000200	GIRT 5" X 20'
8	2	J0000100	SLIDING DOOR JAMB 10'
9	2	J0000110	SLIDING DOOR JAMB 12'
10	16	N9970280	NUT HEX PLTD COARSE 1/4"
11	8	N9970300	NUT HEX PLTD COARSE 3/8"
12	2	P0001715	PURLIN 3" X 12'-4" SIDES
13	1	P0001840	PURLIN 5" X 12'-4" UNDER RIDGE
14	24	S9970010	10-16 X 3/4" TEK SCREW
15	4	T0030870	TAB END WALL UPRIGHT
16	10	T0030880	TAB END WALL / HEADER TO JAMB

FIGURE 22 - (24'-0" END WALL WITH DOOR PARTS LIST)

COVERING TRIM INSTALLATION

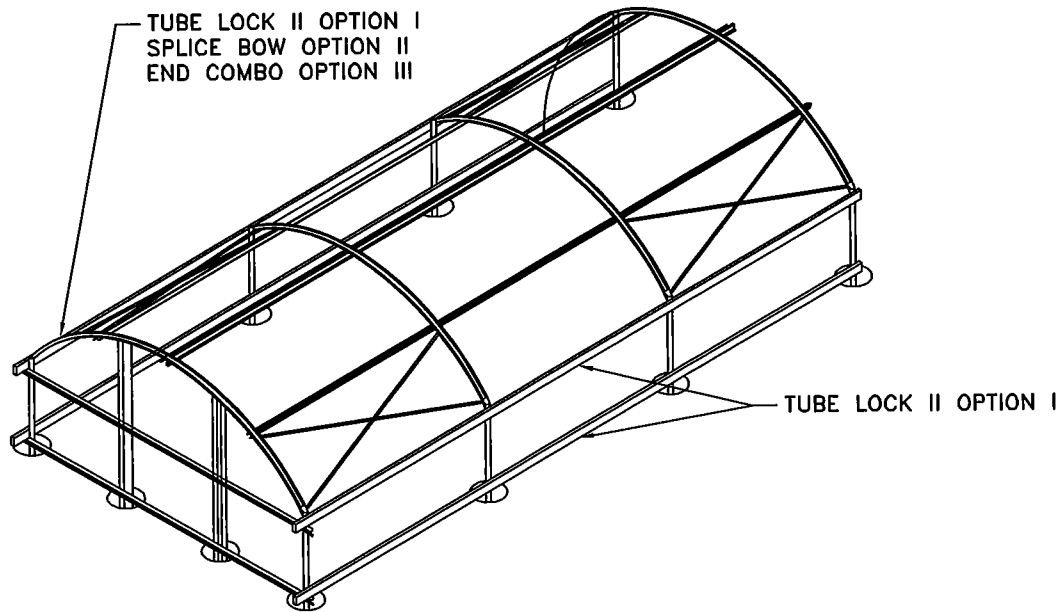
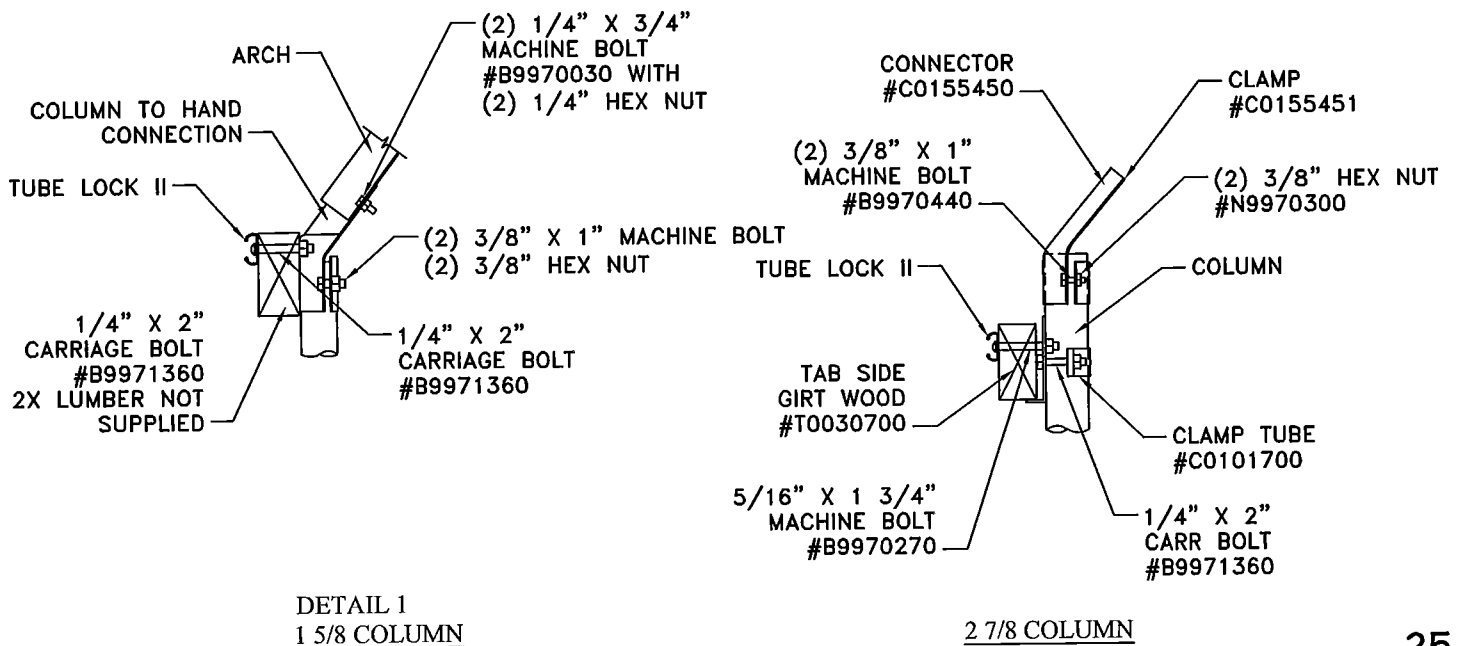


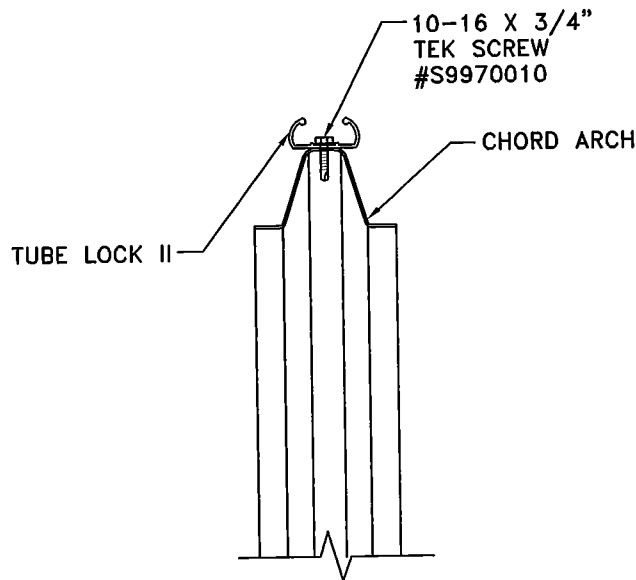
FIGURE 25 - COVERING TRIM INSTALLATION

1. SECURE THE TUBE LOCK AND 2X LUMBER TO THE COLUMN CONNECTION WITH VICE GRIPS. MAKE SURE THAT THEY ARE PLUMB AND LEVEL. DRILL A 5/16" HOLE THROUGH THE TUBE LOCK AND 2X LUMBER.
2. BOLT THE TUBE LOCK AND 2X LUMBER TO THE COLUMN CONNECTION WITH A 1/4" X 2" CARRIAGE BOLT.



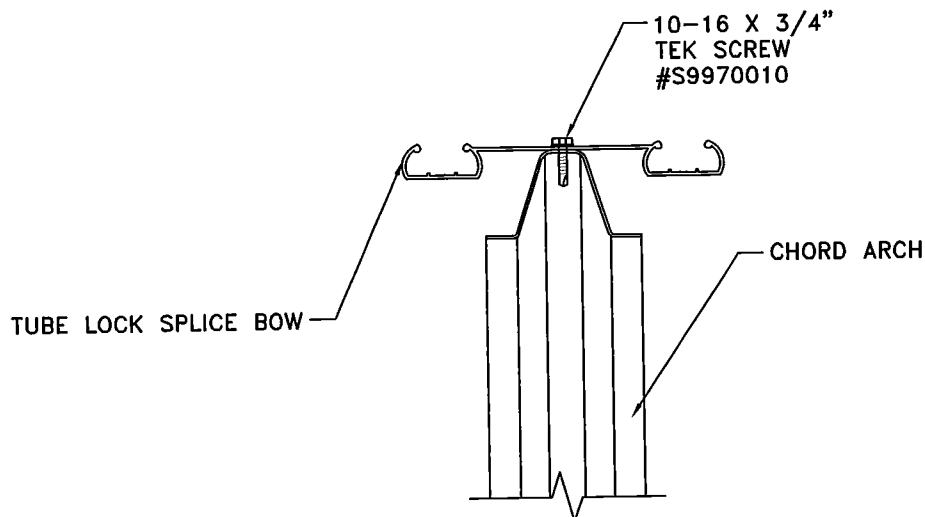
COVERING TRIM INSTALLATION OPTIONS

1. OPTION 1 - TUBE LOCK II - INSTALL THE TUBE LOCK TO THE END ARCH WITH 10-16 X 3/4" TEK SCREWS AT 16" ON CENTER TYPICAL. SEE THE MATERIALS LIST FOR TUBE LOCK PART NUMBER.



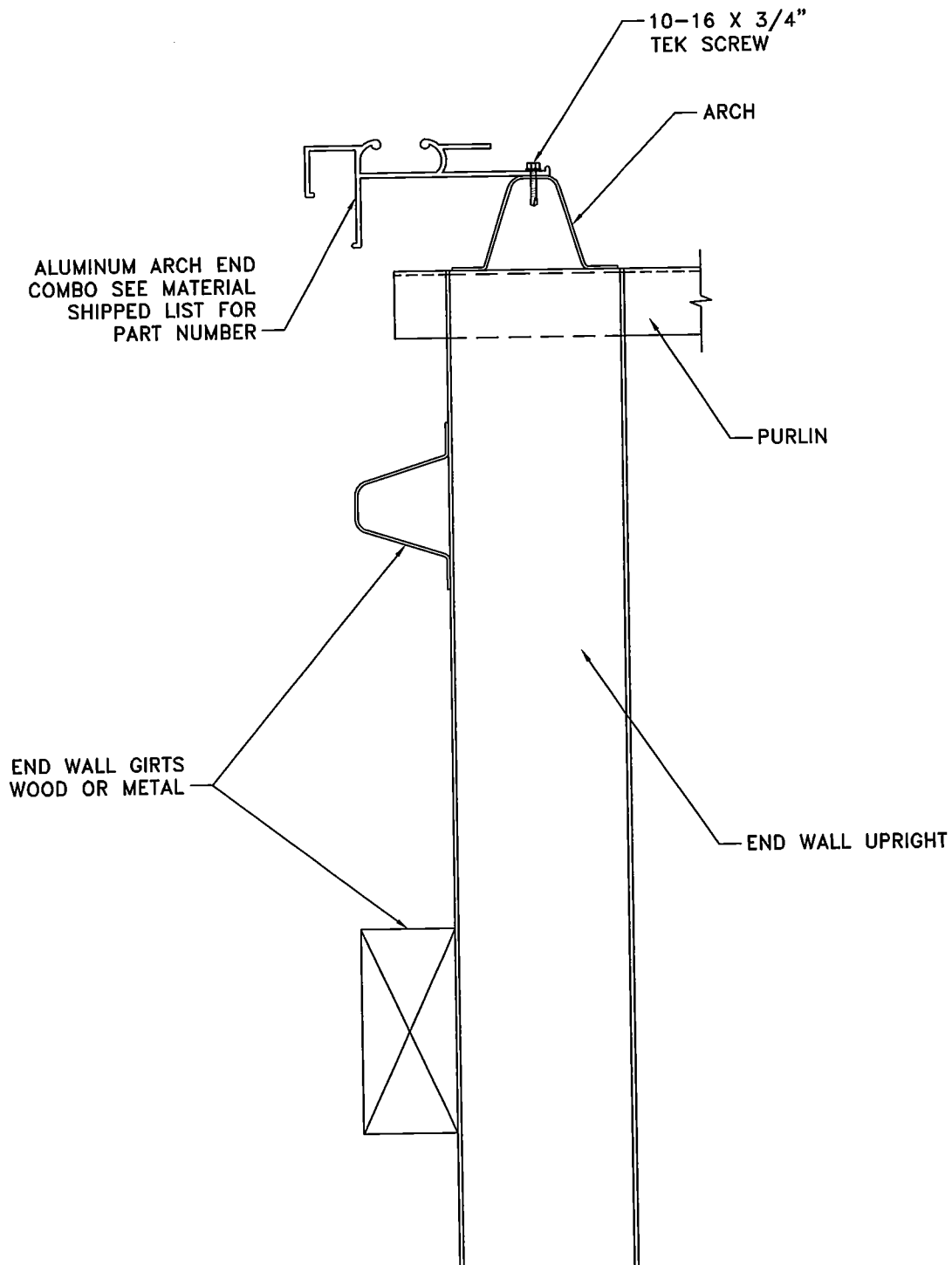
DETAIL 1

2. OPTION 2 - TUBE LOCK SPLICE BOW - IF YOUR BUILDING IS LONGER THAN THE POLY SHEETS SUPPLIED, YOU WILL HAVE A SPLICE BOW. IT WILL BE PLACED ON THE ARCH JUST BEFORE THE POLY SHEETS END. ATTACH IT TO THE ARCH WITH 10-16 X 3/4" TEK SCREW AT 16" ON CENTER.



DETAIL 2

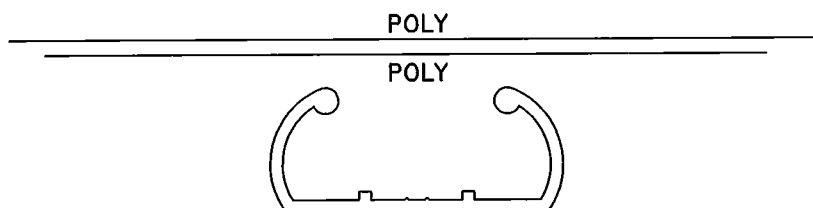
3. OPTION 3-ARCH END COMBO - FOR A FIBERGLASS END WALL COVERING, USE AN ALUMINUM ARCH END COMBO. ATTACH IT TO THE END WALL ARCH WITH A 10-16 X 3/4" TEK SCREWS.



DETAIL 3

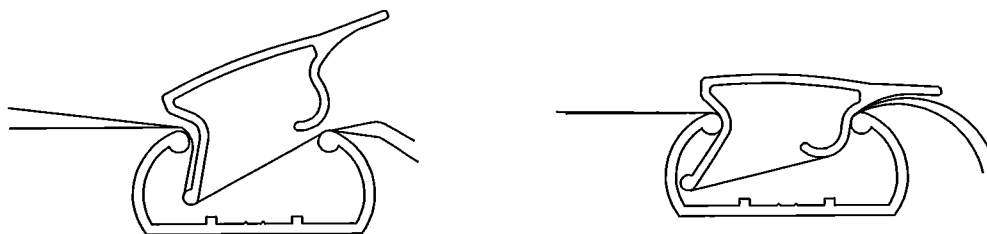
INSTALLATION OF POLY COVERING WITH TUBE LOCK

1. APPLY THE POLY FILM (ONE OR MORE LAYERS) OVER THE PREVIOUSLY INSTALLED TUBE LOCK.



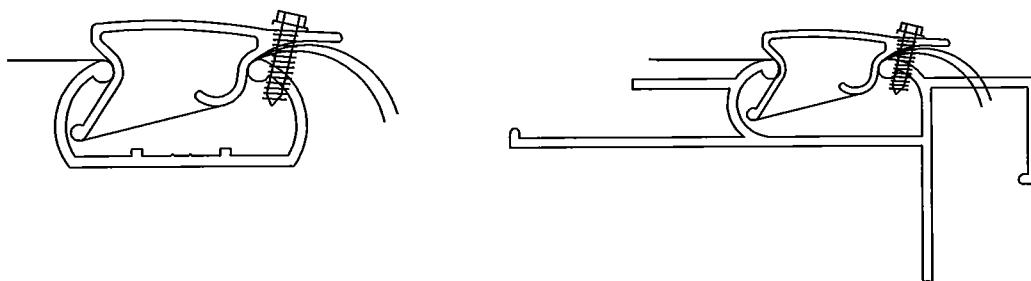
DETAIL 1

2. INSERT THE LONG LEG OF THE CAP FIRST. KEEP IT NEXT TO THE INFLATED SIDE OF THE COVERING.



DETAIL 2

3. TEK SCREW THE TUBE LOCK CAP TO THE BASE OR ARCH END COMBO WITH 10-16 X 3/4" TEK SCREWS AT EACH END.



DETAIL 3

INSTALLATION OF POLY COVERING ON ARCHED BUILDINGS

1. ON SINGLE BUILDINGS, ROLL OUT THE POLY LENGTHWISE NEXT TO BUILDING.
2. WAD UP THE POLY (APPROX. EVERY 20') AND TIE IT WITH ROPES ON THE SIDE OF THE POLY FURTHEST FROM THE BUILDING.
3. THROW ROPES OVER THE BUILDING AND PULL THE POLY ONTO THE BUILDING. REPEAT THIS PROCEDURE FOR MULTIPLE LAYERS OF POLY.
4. INSTALLING POLY REQUIRES A MINIMUM OF FOUR PEOPLE, TWO PEOPLE TO HOLD THE POLY IN PLACE AT THE END OF THE BUILDING, ONE ON EACH SIDE. THE OTHER TWO PEOPLE STARTING AT THE OPPOSITE END OF BUILDING TO INSTALL THE TUBE LOCK CAP SIMULTANEOUSLY, ON EACH SIDE OF BUILDING. SEE PAGE 30 FOR POLY LOCKING INSTRUCTIONS.
5. SECURE THE TUBE LOCK CAP WITH TEK SCREWS AT EACH END.

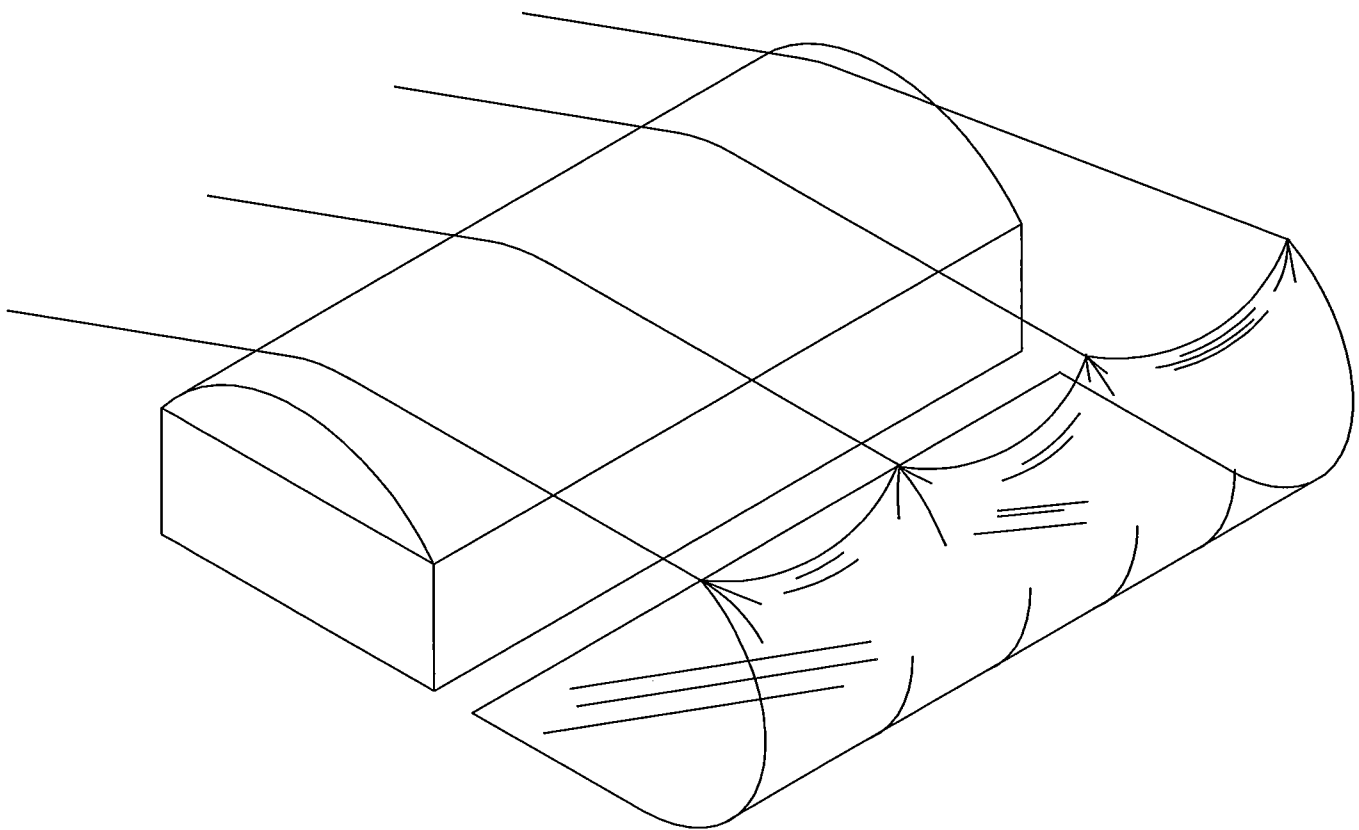


FIGURE 25 - POLY INSTALLATION

INSTALLATION OF INFLATOR FAN

1. ATTACH THE INFLATOR FAN HANGER TO THE GUTTER WITH (2) 5/16" X 3/4" MACHINE BOLTS WITH WASHERS AND (2) 5/16" HEX NUTS.

CAUTION - BE SURE THERE ARE NO UNDERGROUND OR OVERHEAD ELECTRICAL WIRES, WATER PIPES, GAS LINES, ETC. ON OR NEAR THE JOB SITE.

2. CLAMP THE INFLATOR FAN HOSE TO THE INFLATOR FAN (CLAMPS SUPPLIED WITH FAN).
3. ATTACH THE MOUNTING PLATE WITH THE FAN TO THE INFLATOR FAN HANGER WITH (2) 1/4" X 3/4" MACHINE BOLTS AND (2) 1/4" HEX NUTS.
4. TO CUT THE POLY, PUT YOUR HAND BETWEEN THE 2 LAYERS OF POLY AND CUT A HOLE SLIGHTLY SMALLER THAN THE SMALL END OF THE INFLATOR COUPLING IN THE BOTTOM LAYER OF THE POLY, ABOVE THE INFLATOR FAN.

(BE CAREFUL TO KEEP THE CIRCLE CONTINUOUS SO THAT WHEN POLY IS INFLATED THE WALL WILL NOT RIP.)

5. SLIP ONE RUBBER WASHER OVER THE INFLATOR COUPLING. SLIDE THE COUPLING BETWEEN THE TWO LAYERS OF POLY AND PUSH THE SMALL END THROUGH THE HOLE MADE IN STEP 2.
6. SLIP THE SECOND RUBBER WASHER OVER THE SMALL END OF THE COUPLING AND SCREW ON THE NUT, SANDWICHING THE BOTTOM LAYER OF POLY BETWEEN THE TWO RUBBER WASHERS.
7. CLAMP THE INFLATOR HOSE TO THE INFLATOR COUPLING.
8. SECURE THE POLY WITH THE TUBE LOCK. SEE PAGE 5 AND 6.
9. WIRE THE INFLATOR FAN TO 110 VOLT ELECTRICAL OUTLET.

(OPTIONAL)

10. CLAMP THE INTAKE TO THE INFLATOR FAN.
11. CUT A HOLE IN THE SIDE WALL COVERINGS SO THE EXTERIOR VENT CAN SLIDE THROUGH.
12. SLIDE THE VENT THROUGH THE SIDE WALL AND CLAMP THE INTAKE HOSE TO IT.

INFLATOR FAN ASSEMBLY

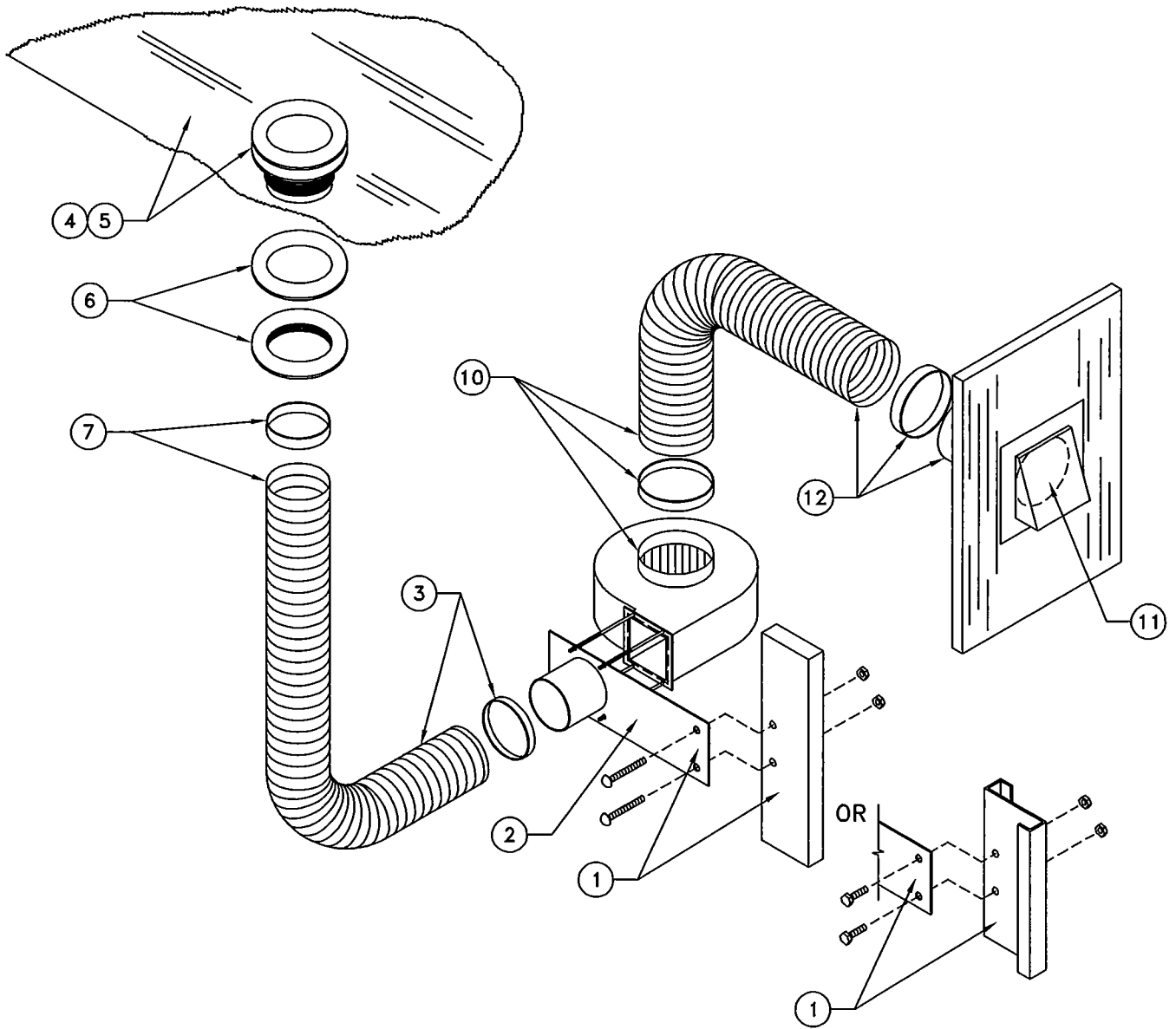
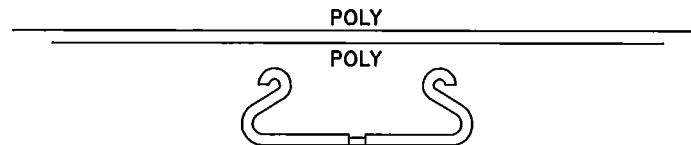


FIGURE 1

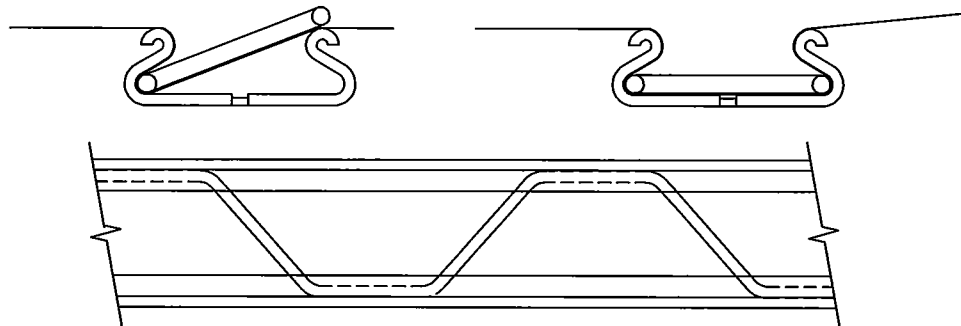
INSTALLATION OF POLY COVERING WITH VINNIPET SPRING

NOTE: TEK SCREW ALL VINNIPET BASE AT A MINIMUM OF 12" ON CENTER

1. APPLY POLY FILM (ONE OR MORE LAYERS) OVER PREVIOUSLY INSTALLED VINNIPET BASE.

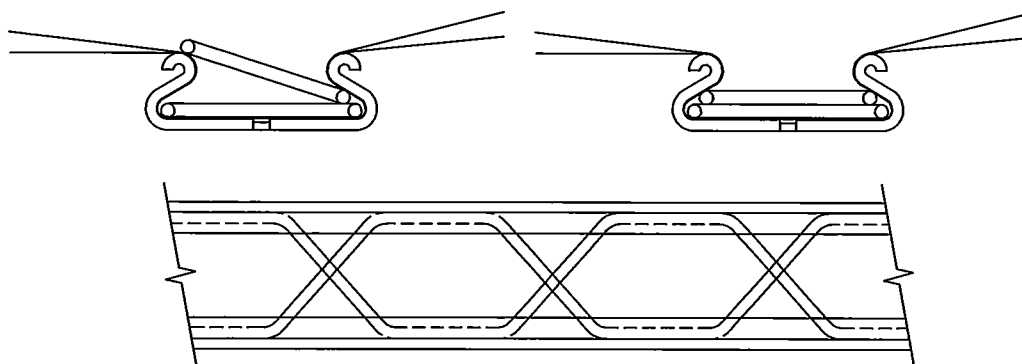


2. INSERT ONE EDGE OF THE VINNIPET SPRING INTO THE VINNIPET BASE. KEEPING POLY TIGHT WEAVE THE VINNIPET SPRING INTO THE BASE SECURING THE POLY.



USE DOUBLE CLIPS WHEN INSTALLING 32' OR
WIDER POLY, DOUBLE POLY, AND / OR BUILDING
IS LOCATED IN HIGH WIND AREA.

3. INSERT ONE EDGE OF THE SECOND VINNIPET SPRING INTO THE VINNIPET BASE. KEEPING POLY TIGHT WEAVE THE SECOND VINNIPET SPRING INTO THE BASE SECURING THE POLY.



WARRANTY CONLEY'S MANUFACTURING AND SALES, THEIR EMPLOYEES OR REPRESENTATIVES, WILL NOT BE RESPONSIBLE FOR ANY DAMAGE TO GREENHOUSE COVERING, STRUCTURES, CROPS OR EQUIPMENT WHEN USED IN CONJUNCTION WITH OUR TUBE - LOCK, OR ANY OTHER LOCKING DEVICE MFG,D BY CONLEY'S MANUFACTURING AND SALES OR OTHERS.