

PROJECT MANUAL

*RE-ROOF / HVAC at CARD CENTER
545 Vallombrosa
Chico, CA 95926*

***Bid Walk Date: 3:00 p.m., January 30, 2019
At Project Site***

***Bid Date: 3:00 p.m., February 14, 2019
Opening at CARD Office
Conference Room
545 Vallombrosa Ave., Chico,
CA 95926***

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NOTICE TO CONTRACTORS

**REROOF /HVAC
at CARD CENTER
545 Vallombrosa
Chico, CA 95926**

NOTICE INVITING BIDS: Chico Area Recreation District shall receive sealed bids for the above Prevailing Wage Project at 545 Vallombrosa Ave, Chico, CA 95926 until **3:00 p.m., February 14**. The bids will be opened publicly.

GENERAL DESCRIPTION OF WORK: Refer to Construction Document prepared by **NorthStar**, 111 Mission Ranch Blvd., Suite 100.

BIDDER INFORMATION: The Plans and Specifications are available in digital format at the Architect's Office. Sub-contractors shall have access the documents at the Builder's Exchanges.

BID WALK: A pre-bid "Job Walk" will be conducted on **January 30 at 3:00 p.m.** at the Project Site, at, 545 Vallombrosa, Chico, CA. The Building will be open and the roof will be accessible for inspection and the Architect will be available to answer questions at that time.

BID SUBMITTAL REQUIREMENTS: Bidders may only submit their bids on the "Bid Form" in the PROJECT MANUAL. Bids must be submitted in a sealed envelope with the Project Name, Contractor Name and the Project Bid Date visible on the envelope.

BID AWARD PROVISIONS; REJECTIONS: An award of the bid, if a bid is awarded, will be made to the lowest **responsible bidder**, whose bid complies with all of these document, within 10 days of the Bid Date. The Owner reserves the right to reject any bid which fails to meet bid requirements in any respect, all bids for any reason whatsoever and to waive minor irregularities in any bid. All bidders must provide a bid for the work described as the "Base Bid" and a bid for the work described as the "Alternate Bid", on the BID FORM.

INSURANCE REQUIRED: The bidder to whom a contract is awarded will be required to furnish, within 14 days of the Notice to Proceed, to the Owner evidence of insurance coverages, and performance and Payment bonds in full conformance with the Contract Documents.

PREVAILING WAGES: Prevailing (State) wages are required to be paid to members of each craft or classification performing work on this project. Pursuant to the Labor Code Section 1720.2, the General Contractor and all Sub-Contractors shall comply with "State of California Prevailing Wage" requirements and be subject to restrictions and penalties in accordance with Section 1771.1 et seq. of the Labor Code which require prevailing wages to be paid to appropriate work classifications in all bid specifications and sub-contracts. In conjunction with all other Labor Code provisions, special attention is made to Labor Code §§ 1771.1 which has been recently changed to require registration of contractors and subcontractors to be eligible for bidding, as follows:

1771.1. (a) A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded. Contractor and subcontractors are directed to the Department of Industrial Relations website for further information and online registration information; <http://www.dir.ca.gov/Public-Works/PublicWorks.html>

PROJECT BID FORM

PROPOSAL TO DO CERTAIN WORK, DESCRIBED AS:

RE-ROOF / HVAC at CARD CENTER
545 Vallombrosa Ave.
Chico, CA 95926

Bids will be received until **3:00 p.m. February 14, 2019, at Chico Area Recreation and Park District, 545 Vallombrosa Ave., Chico, CA 95926** (Mailing Address: Same): at which time they will be opened and read.

CHICO AREA RECREATION DISTRICT RESERVES THE RIGHT TO AWARD THE CONTRACT WITH ANY DEDUCTIVE ALTERNATE BID, ANY COMBINATION OF DEDUCTIVE ALTERNATE BIDS OR ALL DEDUCTIVE ALTERNATE BIDS AT IT'S SOLE DISCRETION.

IT IS CHICO AREA RECREATION DISTRICT'S INTENTION TO AWARD ONE CONTRACT FOR ALL WORK THAT WILL BE AWARDED.

TO: CHICO AREA RECREATION DISTRICT

The undersigned hereby proposes and agrees to furnish any and all required labor, materials, equipment, transportation, and services for the construction of the above titled Project, in strict conformity with the Plans, Specifications, and other documents on file at the office of NORTHSTAR at 111 Mission Ranch Blvd., Chico, CA, 95926. for the total lump sum amount of:

BASE BID:

_____ Dollars \$ _____
(Lump sum written in words)

DEDUCTIVE ALTERNATE BID NO 1: Deletion of a portion of Roof Screens as shown on the drawings. Refer to Section 012300 ALTERNATIVES.

_____ Dollars \$ _____
(Lump sum written in words)

TIME FOR COMPLETION: All work shall be completed within **forty-five (45) consecutive days** after the Contractor is given a Notice to Proceed.

The undersigned agree that should the work not be completed with the time hereinabove stated from and after the date the Contractor is instructed to proceed by CHICO AREA RECREATION DISTRICT, an amount equal to Five Hundred Dollars per day for each day delay after the expiration of such period shall be deducted from the contract sum.

The undersigned has examined the location of the proposed work and is familiar with the Plans, Specifications, and other Documents, and to local conditions at the place where the work is to be performed.

The undersigned has checked carefully all the above figures and understands that CHICO AREA RECREATION DISTRICT will not responsible for any errors or omissions on the part of the undersigned in making up this Bid.

ADDENDA: The undersigned agrees that all Addenda have been reviewed and acknowledged herein shall become a part of and included in this proposal. This proposal includes the following Addenda.

Numbers: _____; _____; _____; _____; _____; _____; _____; _____; _____

NAME OF CONTRACTING FIRM: _____

TYPE OF FIRM: _____
(Corporation, Partnership, etc.)

ADDRESS: _____

CITY & STATE: _____

LICENSE NUMBER: _____ DATED: _____

DIR REGISTRATION NUMBER: _____

CONTRACTORS SIGNATURE: _____

PRINT NAME: _____

Sub-Contractor List attached.

SUB-CONTRACTOR LIST
(Submit as part of Bid Form)

Item of Work: _____

Subcontractors Name: _____

Address/Phone: _____

License Number: _____ *DIR Reg. Number:* _____

Item of Work: _____

Subcontractors Name: _____

Address/Phone: _____

License Number: _____ *DIR Reg. Number:* _____

Item of Work: _____

Subcontractors Name: _____

Address/Phone: _____

License Number: _____ *DIR Reg. Number:* _____

Item of Work: _____

Subcontractors Name: _____

Address/Phone: _____

License Number: _____ *DIR Reg. Number:* _____

Item of Work: _____

Subcontractors Name: _____

Address/Phone: _____

License Number: _____ *DIR Reg. Number:* _____

Item of Work: _____

Subcontractors Name: _____

Address/Phone: _____

License Number: _____ *DIR Reg. Number:* _____

(ADD ADDITIONAL PAGES TO THIS LIST IF NECESSARY)

BIDDERS SIGNATURE: _____ *DATE* _____

**CHICO AREA RECREATION AND PARK DISTRICT
CONSTRUCTION CONTRACT**

CARD / _____

(Contractor)

Re-Roof / HVAC at CARD CENTER

(Project Title)

THIS CONTRACT is executed this ____ day of _____, 2019, between the CHICO AREA RECREATION AND PARK DISTRICT, hereinafter called "CARD", and _____, a(n) (individual), (partnership), (corporation), (enter as appropriate) hereinafter called "Contractor".

ARTICLE I - WITNESSETH, that for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by CARD, Contractor hereby agrees to, at its own proper cost and expense, do all the work and furnish all labor and materials necessary to complete in a good, workmanlike and substantial manner, the public work indicated above and described in the documents listed below and made a part of this Contract by reference thereto, and the same as though set forth herein. Said documents are more fully described as follows:

1. NOTICE TO CONTRACTORS
2. GENERAL PROVISIONS
3. SPECIAL PROVISIONS
4. PROPOSAL dated _____
5. ATTACHMENTS

Said public work is located at 545 Vallombrosa, Chico, County of Butte, State of California.

A requirement shown in any of said documents is as binding as though occurring in all. They are intended to be coordinated and to describe and provide for a complete work. Should it appear that the work to be done or any of the matters relative thereto are not sufficiently explained in said documents or should any of said documents appear to be conflicting, the Contractor shall apply to the CARD for such further explanation as may be necessary, and shall conform to them as part of the Contract. The decisions of the CARD as to the true meaning of any of said documents shall be final.

The work shall be performed in accordance with the directions and specifications set forth in the

above named documents and also in accordance with the following specifications entitled:

1. STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS, 2010
2. STANDARD SPECIFICATIONS OF THE CITY OF CHICO

Said specifications are hereby specifically referred to and by such reference made a part hereof.

ARTICLE II - Contractor agrees to receive and accept the prices set forth in Exhibit "A"

(Contractors Proposal Form) attached hereto and by reference incorporated herein as full compensation for furnishing all labor and materials and doing all the work contemplated and embraced in this Contract; also for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen difficulties or obstruction which may arise or be encountered in the prosecution of the work connected with the work; also for all expenses incurred by or in consequence of the suspension or discontinuance of work, and for well and faithfully completing the work, and the whole thereof, in the manner and according to the plans and specifications and the requirements of the Engineering under them.

ARTICLE III – CARD hereby promises and agrees with Contractor to employ, and does hereby employ, Contractor to provide the labor and materials and to do the public work according to the terms and conditions herein contained and referred to, for the prices aforesaid, and hereby contracts to pay the same at the time, in the manner, and upon the conditions in said GENERAL PROVISIONS, SPECIAL PROVISIONS, PROPOSAL and TECHNICAL SPECIFICATIONS as above set forth; and the said parties, for themselves, their heirs, executors, administrators, successors, and assigns, do hereby agree to the full performance of the covenants herein contained.

ARTICLE IV - It is further expressly agreed by and between the parties hereto that should there be any conflict between the terms of this instrument and the bid or proposal of said Contract, then this instrument shall control, and nothing herein shall be considered as acceptance of the said terms of said proposal conflicting herewith.

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IN WITNESS WHEREOF, the parties hereto have executed these presents in the day and year
first above written.

CONTRACTOR

CHICO AREA RECREATION AND PARK DISTRICT

ADDRESS

BY Ann Willmann
General Manager

CITY/STATE/ZIP

DATE:

BY _____
Signature

TITLE

DATE: _____

CONTRACTOR'S LICENSE NO.

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ARTICLE 1

GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 APPLICABLE CODE REQUIREMENTS. The term "Applicable Code Requirements" means all laws; statutes; the most recent applicable building standard codes, as modified by State Regulations (Title 24); ordinances; rules; regulations; and lawful orders of all public authorities having jurisdiction over CARD, Contractor, any Subcontractor, the Project, the Project site, the Work, or the prosecution of the Work.

1.1.2 CONTRACT AGREEMENT. The term "Contract Agreement" means the written agreement executed between the Owner and the Contractor which requires the Contractor to do all the work and furnish all the labor and materials necessary for the Project, which sets forth the consideration to be paid by Owner to the Contractor for such work, and which incorporates by reference these general provisions.

1.1.3 CONTRACT DOCUMENTS. The "Contract Documents" consist of all documents listed in Article 6 of the Contract Agreement.

1.1.4 CONTRACT MODIFICATION. The term "Contract Modification" means (1) an amendment to the Contract Documents, (2) a change order, (3) a field order, or (4) a letter of instruction.

1.1.5 CONTRACT SUM. The term "Contract Sum" means the entire sum to be paid by Owner to Contractor for all work to be performed on the Project as set forth in the Contract Agreement.

1.1.6 CONTRACT TIME. The term "Contract Time" means the number of days set forth in the Contract Agreement within which full completion of the Work must be achieved. The Contract Time may be adjusted only by change order.

1.1.7 DAY. The term "Day," as used in the bidding requirements and the Contract Documents, shall mean calendar day, unless otherwise specifically provided.

1.1.8 DRAWINGS. The term "Drawings" means the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams. The Drawings are listed in the list of drawings.

1.1.9 FINAL COMPLETION. The term "Final Completion" means the Work has been fully completed in accordance with the Contract Documents as determined by Owner's Representative pursuant to Section 9.7, Final Completion and Final Payment, of the General Conditions.

1.1.10 OWNER. The term "Owner" means (CARD) Chico Area Recreation District.

1.1.11 OWNER'S REPRESENTATIVE. The term "Owner's Representative" means Owner's Director of Public Works or designee identified as such in the Contract Documents.

1.1.12 PRODUCT DATA. "Product Data" are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by Contractor to illustrate or describe materials or equipment for some portion of the Work.

1.1.13 PROJECT. The term "Project" means the total construction of the Work performed under the Contract Documents which may be the whole or a part and which may include construction by Owner or by separate contractors.

1.1.14 SAMPLES. "Samples" are physical examples which illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.

1.1.15 SHOP DRAWINGS. "Shop Drawings" are drawings, diagrams, schedules, and other data specially prepared for the Work by Contractor or a Subcontractor to illustrate some portion of the Work.

1.1.16 SPECIFICATIONS. The term "Specifications" means that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

1.1.17 SUBCONTRACTOR. The term "Subcontractor" means any person or legal entity who contracts with Contractor to provide labor, materials, equipment and/or services required for construction of the Project.

1.1.18 WORK. The term "Work" means the construction and services required by the Contract Documents and includes all labor, materials, equipment, tools, and services provided or to be provided by Contractor to fulfill Contractor's obligations.

1.2 INTERPRETATION

1.2.1 The Contract Documents are complementary and what is required by one shall be as binding as if required by all. In the case of conflict or inconsistency, the Supplementary Conditions shall control over the General Conditions and the Specifications shall control over the Drawings. Figured dimensions shall control over scaled measurements.

1.2.2 The Contract Documents may omit modifying words such as "all" and "any," and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of

either statement. The use of the word "including," when following any general statement, shall not be construed to limit such statement to specific items or matters set forth immediately following such word or to similar items or matters, whether or not non-limiting language (such as "without limitation," "but not limited to," or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement.

1.2.3 Whenever the context so requires, the use of the singular number shall be deemed to include the plural and vice versa. Each gender shall be deemed to include any other gender, and each shall include corporation, partnership, trust, or other legal entity whenever the context so requires. The captions and headings of the various subdivisions of the Contract Documents are intended only as a matter of reference and convenience and in no way define, limit, or prescribe the scope or intent of the Contract Documents or any subdivision thereof.

ARTICLE 2

OWNER

2.1 INFORMATION AND SERVICES PROVIDED BY OWNER

2.1.1 If required for performance of the Work, as determined by Owner's Representative, Owner will make available a survey describing those physical characteristics, boundaries, easements, and utility locations for the Project site of which Owner has actual knowledge.

2.1.2 Contractor will be furnished, free of charge, such copies of the Contract Documents as Owner deems reasonably necessary for execution of the Work.

2.2 OWNER TO PROVIDE ACCESS TO PROJECT SITE

2.2.1 Owner will provide, no later than the date designated in the current contract schedule accepted by Owner's Representative, the lands and facilities upon which the Work is to be performed, including such access to other lands and facilities designated in the Contract Documents for use by Contractor.

2.3 OWNER'S RIGHT TO STOP THE WORK

2.3.1 If Contractor fails to correct defective work as required by Section 12.2 or fails to perform the Work in accordance with the Contract Documents, Owner or Owner's Representative may direct Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated by Contractor. Contractor shall not be entitled to any adjustment of Contract Time or Contract Sum as a result of any such order. Owner and Owner's Representative shall have no duty or responsibility to Contractor or any other party to exercise the right to

2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

2.4.1 If Contractor fails to carry out the Work in accordance with the Contract Documents, fails to provide sufficient labor, materials, equipment, tools, and services to maintain the contract schedule, or otherwise fails to comply with any material term of the Contract Documents, and fails within four (4) days after receipt of notice from Owner to promptly commence and thereafter diligently continue to completion the correction of such failure, Owner may, without prejudice to other remedies Owner may have, correct such failure at Contractor's expense. In such case, Owner shall be entitled to deduct from payments then or thereafter due Contractor the cost of correcting such failure, including compensation for the additional services and expenses of Owner's Representative and Owner's consultants made necessary thereby. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor shall pay the additional amount to Owner.

2.5 OWNER'S RIGHT TO REPLACE OWNER'S REPRESENTATIVE

2.5.1 Owner may at any time and from time to time, without prior notice to or approval of Contractor, replace Owner's Representative with a new Owner's Representative. Upon receipt of notice from Owner informing Contractor of such replacement and identifying the new Owner's Representative, Contractor shall recognize such person or firm as Owner's Representative for all purposes under the Contract Documents.

ARTICLE 3

CONTRACTOR

3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.1.1 Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by Owner, and shall promptly report in writing to Owner's Representative (Architect) any errors, inconsistencies, or omissions in the Contract Documents or inconsistencies with Applicable Code Requirements observed by Contractor.

3.1.2 Contractor shall take field measurements, verify field conditions, and carefully compare with the Contract Documents such field measurements, conditions, and other information known to Contractor before commencing the Work. Errors, inconsistencies, or omissions discovered at any time shall be promptly reported in writing to Owner's Representative.

3.1.3 If Contractor performs any construction activity which it knows or should know involves an error, inconsistency, or omission referred to in Paragraphs 3.1.1 and 3.1.2, without notifying and obtaining the written consent of Owner's Representative, Contractor shall be responsible for the resultant losses, including, without limitation, the costs of correcting defective work.

3.2 SUPERVISION AND CONSTRUCTION PROCEDURES

3.2.1 Contractor shall supervise, coordinate, and direct the Work using Contractor's best skill and attention. Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures, and the coordination of all portions of the Work, unless otherwise shown or specified in the Contract Documents or directed in writing by Owner's Representative.

3.2.2 Contractor shall provide a Project Superintendent on site to control and manage all construction for the project. Work performed by sub-contractors shall only be performed when the project Superintendent is on-site to assure full compliance with the Construction Documents.

3.2.3 Contractor shall be responsible to Owner for acts and omissions of Contractor's agents, employees, and Subcontractors, and their respective agents and employees.

3.2.4 Contractor shall not be relieved of its obligation to perform the Work in accordance with the Contract Documents either by acts or omissions of Owner or Owner's Representative in the administration of the Contract Documents, or by tests, inspections, or approvals required or performed by persons or firms other than Contractor.

3.2.5 Contractor shall be responsible for inspection of **all portions of the Work**, including those portions already performed under the Contract Documents, to determine that such portions conform to the requirements of the Contract Documents and are ready to receive subsequent Work.

3.2.6 Contractor shall at all times maintain good discipline and order among its employees and Subcontractors. Contractor shall provide competent, fully qualified personnel to perform the Work.

3.2.7 Contractor shall furnish Owner's Representative at the beginning of each week with a copy of each of Contractor's daily Project reports prepared by Contractor's superintendent (or other Project manager) for the prior week.

3.3 LABOR AND MATERIALS

3.3.1 Unless otherwise provided in the Contract Documents, Contractor shall provide and pay for all 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 or to be incorporated in the Work.

3.4 CONTRACTOR'S WARRANTY

3.4.1 Contractor warrants to Owner that all materials and equipment used in or incorporated into the Work will be of good quality, new, and free of liens, Claims, and security interests of third parties; that the Work will be of good quality and free from defects; and that the Work will conform with the requirements of the Contract Documents. If required by Owner's Representative, Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.5 TAXES

3.5.1 Contractor shall pay all sales, consumer, use, and similar taxes for the Work or portions thereof provided by Contractor, which are enacted when bids for the Work are received, whether or not yet effective or merely scheduled to go into effect.

3.6 PERMITS, FEES, AND NOTICES

3.6.1 Contractor shall secure approvals, government fees, licenses, and inspections necessary for the proper execution and performance of the Work. The Owner shall pay for the Building Permit. The Contractor shall obtain the Building Permit in his name from the City of Chico. Contractor shall deliver to Owner all original licenses, permits, and approvals obtained by Contractor in connection with the Work prior to the final payment or upon termination of the Contract Agreement, whichever is earlier.

3.7 APPLICABLE CODE REQUIREMENTS

3.7.1 Contractor shall perform the Work in accordance with the following Applicable Code Requirements:

- .1 All laws, statutes, the most recent applicable building standard codes, ordinances, rules, regulations, and lawful orders of all public authorities having jurisdiction over Owner, Contractor, any Subcontractor, the Project, the Project site, the Work, or the prosecution of the Work.
- .2 The Federal Occupational Safety and Health Act and all other Applicable Code Requirements relating to safety.
- .3 Applicable titles in the State of California Code of Regulations.
- .4 Applicable sections in the State of California Labor Code.

3.7.2 If Contractor performs Work which it knows or should know is contrary to Applicable Code Requirements, without prior notice to Owner and Owner's

Representative, Contractor shall be responsible for such Work and shall bear the resultant losses, including, without limitation, the costs of correcting defective work.

3.8 SUPERINTENDENT

3.8.1 Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site at all times during the performance of the Work. The superintendent and any replacement superintendent shall be subject to the approval of Owner. Upon notice from Owner's Representative requesting replacement of a superintendent who is unsatisfactory to Owner, Contractor shall promptly replace such superintendent with a competent superintendent satisfactory to Owner. The superintendent shall have authority to act on behalf of the contractor and all communications given to and received from superintendent shall be binding on Contractor.

3.9 SCHEDULES REQUIRED OF CONTRACTOR

3.9.1 Contractor shall submit a preliminary contract schedule to Owner's Representative in the form and within the time limit required by the Specifications. Owner's Representative will review the preliminary contract schedule with Contractor within the time limit required by the Specifications.

3.9.2 Contractor shall submit a contract schedule to Owner's Representative in the form and within the time limits required by the Specifications, which must be acceptable to Owner's Representative. Contractor shall submit updated contract schedules, which must be acceptable to Owner's Representative, within five (5) days following the end of each calendar month during which Work is in progress or at such other frequency as many be provided by the plans and Specifications. Failure to provide the required acceptable schedules may result in Owner's withholding of partial payments.

3.9.3 The preliminary contract schedule, the contract schedule, and updated contract schedules shall represent a practical plan to complete the Work within the Contract Time. Extension of any schedule beyond the Contract Time shall not be acceptable. Schedules showing the Work completed in less than the Contract Time may be acceptable if judged by Owner's Representative to be practical. However, acceptance of such a schedule by Owner's Representative shall not change the Contract Time. If a schedule showing the Work completed in less than the Contract Time is accepted, Contractor shall not be entitled to extensions of the Contract Time for Excusable Delays or Compensable Delays or to adjustments of the Contract Sum for Compensable Delays until such delays extend the completion of the Work beyond the expiration of the Contract Time.

3.9.4 Contractor shall prepare and keep current, to the satisfaction of Owner's Representative, a schedule of submittals, as required by the Specifications, and that is coordinated with the construction contract schedule.

3.9.5 Owner's Representative's review of the form and general content of the preliminary construction contract schedule, contract schedule, and updated contract schedules is for the purpose of determining, in its judgment, whether the following requirements are satisfied:

- .1 Schedules must be suitable for monitoring progress of the Work.**
- .2 Schedules must provide necessary data about the timing for Owner decisions and Owner-furnished items.**
- .3 Schedules must be in sufficient detail to demonstrate adequate planning for the Work.**
- .4 Schedules must represent a practical plan to complete the Work within the Contract Time.**

Contractor shall plan, develop, supervise, control, and coordinate the performance of the Work so that its progress and the sequence and timing of Work activities conform to the current accepted contract schedule. Contractor shall continuously obtain from Subcontractors information and data about the planning for and progress of the Work and the delivery of equipment, shall coordinate and integrate such information and data into updated contract schedules, and shall monitor the progress of the Work and the delivery of equipment. Contractor shall act as the expeditor of potential and actual delays, interruptions, hindrances, or disruptions for its own forces and those forces of Subcontractors, regardless of tier. Contractor shall cooperate with Owner's Representative in the development of the contract schedule and updated contract schedules.

Owner's Representative's acceptance of or its review comments about any schedule or scheduling data shall not relieve Contractor from its sole responsibility to plan for, perform, and complete the Work within the Contract Time. Acceptance of or review comments about any schedule shall not transfer responsibility for any schedule to Owner's Representative or Owner nor imply their agreement with (1) any assumption upon which such schedule is based or (2) any matter underlying or contained in such schedule.

Failure of Owner's Representative to discover errors or omissions in schedules that it has reviewed, or to inform Contractor that Contractor, Subcontractors, or others are behind schedule, or to direct or enforce procedures for complying with the contract schedule shall not relieve Contractor from its sole responsibility to perform and complete the Work within the Contract Time and shall not be a cause for an adjustment of the Contract Time or the Contract Sum.

3.9.6 Contractor shall perform the Work in accordance with the current accepted contract schedule.

3.10 DOCUMENTS AND SAMPLES AT PROJECT SITE

3.10.1 Contractor shall maintain the following at the Project site:

- .1 One record copy of the Contract Documents, in good order and marked to record current changes and selections made during construction.
- .2 The current accepted contract schedule.
- .3 Shop Drawings, Product Data, and Samples.
- .4 All other required submittals.
- .5 A copy of each subcontract requiring Work to be done for the Project.

These shall be available to Owner's Representative and shall be delivered to Owner's Representative for submittal to Owner upon the earlier of Final Completion or termination of the Contract Agreement.

3.11 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

3.11.1 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate, for those portions of the Work for which submittals are required, how Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.

3.11.2 Contractor shall review, approve, and submit to Owner's Representative Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of Owner or of separate contractors. Submittals made by Contractor which are not required by the Contract Documents may be returned without action by Owner's Representative.

3.11.3 Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples, or similar submittals until the respective submittal has been reviewed by Owner's Representative and no exceptions have been taken by Owner's Representative. Such Work shall be in accordance with approved submittals and the Contract Documents.

3.11.4 By approving and submitting Shop Drawings, Product Data, Samples, and similar submittals, Contractor represents that it has determined or verified materials and field measurements and conditions related thereto, and that it has checked and coordinated the information contained within such submittals with the requirements of the Contract Documents and Shop Drawings for related Work.

3.11.5 If Contractor discovers any conflicts, omissions, or errors in Shop Drawings or other submittals, Contractor shall notify Owner's Representative and receive instruction before proceeding with the affected Work.

3.11.6 Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by Owner's Representative's review of Shop Drawings, Product Data, Samples, or similar submittals, unless Contractor has specifically informed Owner's Representative in writing of such deviation at the time of submittal and Owner's Representative has given written approval of the specific deviation. Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals by Owner's Representative's review, acceptance, comment, or approval thereof.

3.11.7 Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by Owner's Representative on previous submittals.

3.12 USE OF SITE AND CLEAN UP

3.12.1 Contractor shall confine operations at the Project site to areas permitted by law, ordinances, permits, and the Contract Documents. Contractor shall not unreasonably encumber the Project site with materials or equipment.

3.12.2 Contractor shall, during performance of the Work, keep the Project site and surrounding area free from the accumulation of excess dirt, waste materials, and rubbish caused by Contractor. Contractor shall remove all excess dirt, waste material, and rubbish caused by the Contractor; tools; equipment; machinery; and surplus materials from the Project site and surrounding area at the completion of the Work.

3.12.3 Personnel of Contractor and Subcontractors shall not occupy, live upon, or otherwise make use of the Project site during any time that Work is not being performed at the Project site, except as otherwise provided in the Contract Documents.

3.13 CUTTING AND PATCHING

3.13.1 Contractor shall do all cutting, fitting, or patching of the Work required to make all parts of the Work come together properly and to allow the Work to receive or be received by Work of separate contractors shown upon, or reasonably implied by, the Contract Documents.

3.13.2 Contractor shall not endanger the Work, the Project, or adjacent property by cutting, digging, or otherwise. Contractor shall not cut or alter the Work of any separate contractor without the prior consent of Owner's Representative.

3.14 ACCESS TO WORK

3.14.1 Owner, Owner's Representative, their consultants, and other persons authorized by Owner shall at all times have access to the Work wherever it is in preparation or progress. Contractor shall provide safe and proper facilities for such access and for inspection.

3.15 ROYALTIES AND PATENTS

3.15.1 Contractor shall pay all royalties and license fees required for the performance of the Work. Contractor shall defend suits or Claims resulting from Contractor's or any Subcontractor's infringement of patent rights and shall indemnify Owner and Owner's Representative from losses on account thereof.

3.16 CONCEALED OR UNKNOWN CONDITIONS

3.16.1 If conditions are encountered by Contractor or any Subcontractor at the Project site which are:

- .1 subsurface,
- .2 otherwise concealed and unusual, or
- .3 unknown and unusual physical conditions, which differ materially from those:
 - .1 indicated in or reasonably inferable from the Contract Documents, or
 - .2 discoverable by a reasonable pre-bid Project site inspection, then Contractor shall give notice to Owner's Representative promptly before such conditions are disturbed and no later than three (3) days after the first observance of such conditions. Owner's Representative will promptly, using reasonable efforts to minimize delay to the progress of the Work, investigate and determine if such conditions meet the criteria specified above. If such criteria are met, Owner's Representative will determine what action shall be taken and to what extent, if any, adjustments should be made to the Contract Sum and the Contract Time. Owner's Representative will state the reasons for such determination in writing.

3.17 REPAIR OF DAMAGED WORK

3.17.1 Contractor shall promptly repair and replace any Work or materials damaged or destroyed prior to Final Completion. If such damage to or loss of the Work does not arise, in whole or in part, from the acts or omissions of Contractor, any Subcontractor, anyone directly or indirectly employed by either of them, or anyone for whose acts either of them may be liable, the following may occur:

- .1 The Contract Time will be subject to adjustment by change order.
- .2 The Contract Sum will be subject to adjustment by change order, if and to the extent that the actual costs of such repair and replacement exceed the greater of the following:

- .1 The proceeds of insurance received by Contractor for such loss.
- .2 The amount of insurance proceeds which would have been obtained under the insurance policies required to be maintained by Contractor under the Contract Documents.
- .3 The amount of insurance proceeds which would have been obtained under the insurance policies required to be maintained by Contractor under the Contract Documents, but for the insurers' inability or refusal to honor such policies.

3.18 DUTY TO DEFEND

3.18.1 To the fullest extent permitted by law, the Contractor shall defend Owner from and against all suits filed against Owner alleging Claims (including costs of attorneys' fees) by reason of liability imposed by law and all Claims, including but not limited to, Claims of personal injury, death, damage to property and loss of use thereof, or any Claims arising out of Contractor's performance of the Contract Agreement, or damages or other relief based on allegations of the failure of the Contractor or its Subcontractors to properly perform its obligations under the Contract Agreement, or the Contractor's violations of any legal duties, even if the allegations of any such suit are groundless, false or fraudulent, and the Contractor may make such investigation and settlement of any such suit as it deems expedient. This duty to defend is separate and independent from the Contractor's duty to indemnify and hold harmless Owner from such Claims. Any failure to fulfill this obligation shall be a default of the Contractor's performance obligations under the Contract Agreement.

3.19 DUTY TO INDEMNIFY

3.19.1 To the fullest extent permitted by the law, the Contractor shall hold harmless and indemnify Owner from and against all Claims, losses and expenses (including costs of attorneys' fees) by reason of liability imposed by law for any and all Claims, including but not limited to, Claims of personal injury, death, damage to property and loss of use thereof, or any Claims arising out of Contractor's performance of the Contract Agreement, or damages or other relief based on allegations of the failure of the Contractor or its Subcontractors to properly perform its obligations under the Contract Agreement, or the Contractor's violations of any legal duties. Any failure to fulfill this obligation shall be a default of the Contractor's performance obligations under the Contract Agreement.

ARTICLE 4**ADMINISTRATION OF THE CONTRACT****4.1 ADMINISTRATION OF THE CONTRACT BY OWNER'S REPRESENTATIVE**

4.1.1 Owner's Representative (Architect) will provide administration of the Contract Documents in the manner provided therein and will be the representative of Owner as follows:

- .1 During construction.
- .2 Until final payment is due.
- .3 At Owner's request from time to time during the guarantee to repair period described in Section 12.2.

Owner's Representative will have authority to act on behalf of Owner only to the extent provided in the Contract Documents. The approval by any architect or designer providing design services for Owner of any modification to the Drawings or Specifications and/or any time extension is not effective unless and until incorporated into a change order approved by Owner's Representative.

4.1.2 Owner's Representative will visit the Project site at intervals appropriate to the stages of construction to become familiar with the progress and quality of the completed Work and to determine if the Work is being performed in accordance with the Contract Documents. However, no actions taken during such Project site visit by Owner's Representative shall relieve Contractor of its obligations as described in the Contract Documents.

4.1.3 Owner's Representative will not have control over, will not be in 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, since these are solely Contractor's responsibility, unless otherwise required by the Contract Documents.

4.1.4 Except as otherwise provided in the Contract Documents or when direct communications have been specifically authorized, Owner and Contractor shall communicate through Owner's Representative. Communications by Contractor with Owner's consultants shall be through Owner's Representative. Communications by Owner and Owner's Representative with Subcontractors shall be through Contractor. Communications by Contractor and Subcontractors with separate contractors shall be through Owner's Representative. Contractor shall not rely on oral or other non-written communications.

4.1.5 Based on Owner's Representative's Project site visits and evaluations of Contractor's partial payment requests, Owner's Representative will review and certify the amounts, if any, due Contractor and will issue certificates for payment in such amounts.

4.1.6 Owner's Representative will have the authority to reject the Work, or any portion thereof, which does not conform to the Contract Documents. Owner's Representative shall have the authority to stop the Work or any portion thereof. Whenever Owner's Representative considers it necessary or advisable for implementation of the intent of the Contract Documents, Owner's Representative will have the authority to require additional inspection or testing of the Work in accordance with the Contract Documents, whether or not such Work is fabricated, installed, or completed. However, no authority of Owner's Representative conferred by the Contract Documents, nor any decision made in good faith either to exercise or not exercise such authority, shall give rise to a duty or responsibility of Owner's Representative to Contractor, Subcontractors, directors, officers, agents, or employees of Contractor or Subcontractors, any other person or firm performing portions of the Work, or third parties.

4.1.7 Owner's Representative will prepare change orders, field orders, and letters of instruction.

4.1.8 Owner's Representative will conduct project visit and observations in connection with Beneficial Occupancy, as described in Section 9.6, and to determine the dates of substantial completion and Final Completion; will receive and forward to Owner, for Owner's review, any records, written warranties, and related documents required by the Contract Documents and assembled by Contractor; and will issue a final certificate for payment upon Contractor's compliance with the requirements of the Contract Documents.

4.1.9 Owner's Representative shall be, in the first instance, the interpreter of the requirements of the Contract Documents and the judge of performance thereunder by Contractor. Should Contractor discover any conflicts, omissions, or errors in the Contract Documents; have any questions about the interpretation or clarification of the Contract Documents; question whether Work is within the scope of the Contract Documents; or question that Work required is not sufficiently detailed or explained, then, before proceeding with the Work affected, Contractor shall notify Owner's Representative in writing and request interpretation, clarification, or furnishing of additional detailed instructions. Owner's Representative's response to questions and requests for interpretations, clarifications, instructions, or decisions will be made with reasonable promptness. Should Contractor proceed with the Work affected before receipt of a response from Owner's Representative, any portion of the Work which is not done in accordance with Owner's Representative's interpretations, clarifications, instructions, or decisions shall be removed or replaced and Contractor shall be responsible for all resultant losses.

4.2 CLAIMS

4.2.1 The term "Claim" means a written demand or assertion by Contractor seeking, as a matter of right, adjustment or interpretation of the terms of the Contract Documents, payment of money, extension of time, or other relief with respect to the Contract Documents, or determination of other disputes or matters in question between Owner and Contractor arising out of or related to the Contract Documents or the performance of the Work, including Claims alleging an error or omission by Owner's Representative. However, the term "Claim" shall not include, and the claims procedures provided under this Article 4 shall not apply to the following:

- .1 Claims respecting penalties for forfeitures prescribed by statute or regulation which a government agency is specifically authorized to administer, settle, or determine.
- .2 Claims respecting personal injury, death, reimbursement, or other compensation arising out of or resulting from liability for personal injury or death.
- .3 Claims respecting a latent defect, breach of warranty, or guarantee to repair.
- .4 Claims respecting stop notices.

4.2.2 A Claim must be stated with specific owner, including identification of the event giving rise to the Claim, the date of the event, and the asserted effect on the Contract Sum and the Contract Time. The Claim shall include adequate supporting data. Adequate supporting data for a Claim for an adjustment of the Contract Time shall include scheduling data demonstrating the impact of the event on completion of the Work. Adequate supporting data for a Claim for an adjustment of the Contract Sum shall include a detailed cost breakdown of items allowed under Section 7.2. If the exact amount of a Claim is not ascertainable at the time such Claim is made, such supporting data as are then available shall be submitted. Supplemental data supporting the exact amount of the Claim shall be submitted as soon as available.

4.2.3 Submission of a Claim, and all supporting data, correspondence, and documentation relating thereto, shall be made in accordance with Section 15.8.

4.2.4 Contractor shall provide written notice to Owner's Representative of a potential Claim for additional time or compensation as soon as possible and before proceeding to execute the Work or portions of the Work giving rise to any such Claim. The written notice of potential Claim shall set forth the reasons the Contractor believes additional compensation or time may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential Claim. Thereafter, Contractor shall submit a more detailed Claim in the manner required by Section 4.3. Contractor hereby expressly waives any Claims of which Contractor was aware, whether or not the exact amounts of such Claims were ascertainable, that are not submitted to Owner's Representative prior

to Contractor proceeding to execute the Work or portions of the Work giving rise to such Claims.

4.3 ASSERTION OF CLAIMS

4.3.1 SUBMISSION TO OWNER'S REPRESENTATIVE. All Claims shall be first submitted to Owner's Representative within the time limits provided in Paragraphs 4.2.4 and 4.3.3. Such submission to Owner's Representative shall be a condition precedent to submission of such Claim to mediation or arbitration.

4.3.2 CONTINUING CONTRACT PERFORMANCE. Notwithstanding the making of any Claim or the existence of any dispute regarding any Claim, unless otherwise directed by Owner's Representative, Contractor shall not cause any delay, cessation, or termination in or of Contractor's performance of the Work, but shall diligently proceed with performance of the Work in accordance with the Contract Documents. Owner will continue to make payments in accordance with the Contract Documents.

4.3.3 TIME LIMIT ON CLAIMS. Contractor shall submit documentation in support of a Claim, together with adequate supporting data, to Owner's Representative as soon as possible but not later than twenty-one (21) days after the occurrence of the event giving rise to the Claim or the date Contractor first recognized, or reasonably should have recognized, the condition giving rise to the Claim, whichever is later. Contractor hereby expressly waives all Claims not made within the aforesaid time limits.

4.4 DECISION ON CLAIMS

4.4.1 Owner's Representative shall promptly review Claims. If Owner's Representative reasonably determines that additional supporting data are necessary, Owner's Representative shall request such additional data within ten (10) days after receipt of the Claim. Such data shall be furnished no later than ten (10) days after such request. Owner's Representative shall render a decision promptly, but, in any event, within forty-five (45) days after the later of the receipt of the Claim or the receipt of such additional supporting data; provided that, if the amount of the Claim is in excess of \$50,000, the aforesaid forty-five (45) day period shall be sixty (60) days. Failure of Owner's Representative to render a decision within the aforesaid forty-five (45) or sixty (60) day period shall be deemed a decision denying the Claim and the last day of such period shall be the date of such decision. The decision of Owner's Representative shall be final and binding, subject, however, to arbitration as provided in Paragraph 4.4.2.

4.4.2 If either Contractor or Owner disputes Owner's Representative's decision on a Claim, such party (the "Disputing Party") may initiate arbitration not later than one hundred eighty (180) days after the date of service in person or by mail on the Disputing Party of the final written decision of Owner's Representative or, if no written decision has been issued, within two hundred forty (240) days after acceptance of the Work.

4.4.3 If a demand for arbitration is not filed by either party within one hundred eighty (180) days after the written decision of Owner's Representative, that decision shall be final and binding, both parties shall have waived the right to arbitrate, and there shall

not be any right to arbitrate or litigate such waiver or any other dispute arising out of the Contract Documents.

4.5 ARBITRATION

NOT PART OF THIS PROJECT

4.6 MEDIATION

4.6.1 If the parties to a dispute agree in writing, any Claim appealed from the decision of Owner's Representative may be submitted to mediation in accordance with the Construction Industry Mediation Rules of the American Arbitration Association ("AAA") then in effect.

ARTICLE 5

SUBCONTRACTORS

5.1 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.1.1 Unless otherwise stated in the Contract Documents, Contractor shall submit in writing, prior to entering into subcontract agreements, the names and addresses of all Subcontractors proposed for the Work that were not previously listed in Contractor's bid. Any Subcontractor may be disqualified if Owner or Owner's Representative determines that such Subcontractor fails to meet the requirements of the Contract Documents or for any other reason.

5.1.2 In accordance with the Subletting and Subcontracting Fair Practices Act, nothing herein shall be deemed to entitle Contractor, without the approval of Owner, to substitute other Subcontractors for those named in Contractor's list of Subcontractors and list of changes in Subcontractors due to alternates contained in the completed bid form; and, except with such approval, no such substitution shall be made.

5.1.3 Except as hereinafter provided, any increase in the cost of the Work resulting from the replacement or substitution of a Subcontractor, as required by Owner or Owner's Representative pursuant to Paragraph 5.1.1, shall be borne solely by Contractor and Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time on account of such replacement or substitution. However, if a replacement or substitution of any Subcontractor is made as a result of the request of Owner or Owner's Representative for any reason other than failure of such Subcontractor to meet the requirements of the Contract Documents, the Contract Sum shall be subject to adjustment of an amount equal to the increase or decrease in the original subcontract amount. In such cases and at the request of Owner, the

replacement Subcontractor shall be selected through a competitive bidding process acceptable to Owner.

5.2 SUBCONTRACTUAL RELATIONS

5.2.1 All subcontracts shall be in writing and shall require the Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to Contractor by the terms of the Contract Documents, to assume toward Contractor all the obligations and responsibilities which Contractor assumes towards Owner by the Contract Documents, and to perform such portion of the Work in accordance with the Contract Documents. Each such subcontract shall preserve and protect the rights of Owner under the Contract Documents, with respect to the Work to be performed by Subcontractor, so that subcontracting thereof will not prejudice such rights. Contractor shall cause each such subcontract to expressly include the following requirements:

- .1 Subcontractor waives all rights that Subcontractor may have against Owner for damages caused by fire or other perils covered by builder's risk property insurance carried by Contractor or Owner, except for such rights Subcontractor may have to the proceeds of such insurance held by Owner under Article 11.
- .2 Owner and entities and agencies designated by Owner shall have access to and the right to audit and copy at Owner's cost all of Subcontractor's books, records, contracts, correspondence, instructions, drawings, receipts, vouchers, purchase orders, and memoranda relating to the Work. Subcontractor shall preserve all such records and other items for a period of at least three (3) years after Final Completion.
- .3 Subcontractor recognizes the rights of Owner under Section 5.3, Contingent Assignment of Subcontracts, and agrees, upon notice from Owner that Owner has elected to accept said assignment and to retain Subcontractor pursuant to the terms of the subcontract, to complete the unperformed obligations under the subcontract and, if requested by Owner, to execute a written agreement confirming that Subcontractor is bound to Owner under the terms of the subcontract.

5.2.2 Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and Owner, except when, and only to the extent that, Owner elects to accept the assignment of the subcontract with such Subcontractor pursuant to Section 5.3, Contingent Assignment of Subcontracts.

5.2.3 No Subcontractors shall commence to Work at the Project unless and until their subcontract is available for inspection at the Contractor's office at the Project site. Upon request of Owner's Representative, any or all subcontracts shall be produced for inspection. Any failure to produce a requested subcontract for inspection by Owner's Representative will be cause for Owner to withhold partial payments.

5.3 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

5.3.1 Contractor hereby assigns to Owner all its interest in subcontracts now or hereafter entered into by Contractor for performance of any part of the Work. The assignment will be effective upon acceptance by Owner in writing and only as to those subcontracts which Owner designates in writing. Owner may accept said assignment at any time during the course of the Work and prior to Final Completion in the event of a suspension or termination of Contractor's rights under the Contract Documents. Such assignment is part of the consideration to Owner for entering into the Contract Agreement with Contractor and may not be withdrawn prior to Final Completion.

ARTICLE 6

SITE INVESTIGATION AND CONDITIONS

6.1 SITE INFORMATION PROVIDED BY OWNER

6.1.1 The Owner has made available to the Contractor, prior to the receipt of bids, all information of which Owner is aware as to surface and subsurface conditions in the vicinity of the Project site, including any topographical maps, reports of investigation of soil or subsurface conditions and logs of test borings, written opinions of technical advisers, and other information. All such information was obtained by Owner to assist the Project consultants and provide geotechnical data for site preparation, grading and design of foundations.

6.1.2 The information which Owner has made available is not part of the Contract Documents and was made available solely for the convenience of the Contractor. It is expressly understood and agreed that the Owner assumes no responsibility whatsoever in respect to the sufficiency or accuracy of any investigation Owner has made, the records thereof, or of the interpretations set forth therein, and there is no warranty or guaranty, express or implied, that the conditions indicated by such investigations or records are representative of those existing throughout the Project site or any part thereof, or that unanticipated developments may not occur, or that materials other than, or in proportions different from those indicated, may not be encountered.

6.2 CONTRACTOR'S DUTY TO INSPECT SITE

6.2.1 The availability to the Contractor of Owner's information shall not be construed as a waiver of the Contractor's duty to examine the Project site. The Contractor represents that prior to submitting a bid, the Contractor visited the Project site and made such independent investigations and examinations deemed necessary to determine the existing conditions, nature of materials to be encountered and other facts concerning or affecting the Work to be performed under the Contract Documents.

6.3 RISK OF UNANTICIPATED SOIL OR SUBSURFACE CONDITIONS

6.3.1 The information which Owner has made available to Contractor will not relieve the Contractor from the risk of unanticipated soil or subsurface conditions or other physical conditions which were discoverable by a reasonable pre-bid inspection of the project site or from properly fulfilling the terms of the Contract Documents at the Contract Sum.

ARTICLE 7

CHANGES IN THE WORK

7.1 CHANGES

7.1.1 Owner may, from time to time, order additions, deletions, and other changes in the Work. Changes in the Work may be effected by change order or field order without invalidating the Contract Agreement and without notice to sureties.

7.1.2 Contractor shall proceed promptly with any changes in the Work, unless otherwise provided in the relevant change order, field order, or letter of instruction.

7.1.3 An adjustment of the Contract Time shall not be made unless the change described in the change order affects Work that is on the critical path of the Contract Schedule or otherwise affects critical Work activities.

7.2 CHANGE ORDERS

7.2.1 A change order is a written instrument prepared by Owner's Representative, which provides for the following:

- .1 A change in the Work, if any.
- .2 An adjustment of the Contract Sum, if any.
- .3 An adjustment of the Contract Time, if any.

Change orders cannot be authorized by Owner's project architect or by anyone other than Owner's Representative, unless specifically authorized by the plans and specifications.

7.2.2 If requested, Contractor shall promptly provide Owner's Representative with a change order proposal, in the form attached hereto marked Exhibit A and by this reference incorporated herein, setting forth Contractor's proposed adjustments of the Contract Sum and the Contract Time, if any, for performing the change in the Work.

Adjustments of the Contract Sum shall be determined using the methods described in this Section 7.2.

7.2.3 When Work is omitted by change order, the adjustment to the Contract Sum shall be computed on the basis of one or more of the following:

- .1 Unit prices stated in the Contract Documents (Refer to Section 012200) or agreed upon by Owner's Representative and Contractor.
- .2 A lump sum agreed upon by Owner's Representative and Contractor, based upon the estimated costs of the omitted portions of the Work, with no Contractor fee.
- .3 As determined by Owner's Representative, if Owner and Contractor cannot agree upon one or both of the methods described above, which determination shall be in accordance with the methods described in Paragraphs 7.2.4 to 7.2.12.

7.2.4 **EXTRA WORK PERFORMED BY CONTRACTOR.** The Contractor will be paid the direct costs for labor, materials and equipment used in performing extra work approved by Owner's Representative there will be added a markup for overhead and profit of ten percent (10%) to the cost of labor, five percent (5%) to the cost of materials, and ten percent (10%) to the equipment rental. These markups shall constitute full compensation for all profit and overhead costs, regardless of whether the work was performed by Contractor or a Subcontractor, and shall be deemed to include all items of expense not specifically designated as cost or equipment rental.

7.2.5 **PAYMENT.** Payment as provided in Paragraphs 7.2.4 "Extra Work Performed by Contractor" shall constitute full compensation to the Contractor for performance of extra work and no additional compensation will be allowed therefor. The payment will be made in accordance with the provisions in Section 9.2 "Partial Payment."

7.3 FIELD ORDERS

7.3.1 A field order describing the scope of the change in the Work and the estimated adjustments of the Contract Sum and the Contract Time may be issued by Owner's Representative to order a change in the Work before the terms of the change incorporated into a change order. If appropriate, Contractor shall promptly provide Owner's Representative with a change order proposal, in the form attached hereto marked Exhibit A, setting forth its estimate of the adjustments of the Contract Sum and the Contract Time, if any, for performing the change in the Work. The field order will be superseded by a change order which shall include the actual adjustments, if any, of the Contract Sum and the Contract Time, as well as the scope of the change in the Work. Only Owner's Representative has the authority to issue field orders, except when otherwise provided in the plans or Specifications.

7.3.2 If the field order provides for an adjustment of the Contract Sum, the adjustment shall be based upon one of the methods described in Section 7.2.

7.3.3 Upon receipt of a field order, Contractor shall promptly proceed with the change in the Work. Contractor shall advise Owner's Representative of its agreement or disagreement with the method, if any, provided in the field order for determining the proposed adjustments of the Contract Sum and the Contract Time.

7.3.4 A field order signed by Contractor indicates the agreement of Contractor therewith, including Contractor's agreement to the estimated adjustments of the Contract Sum and the Contract Time and the methods used to determine those adjustments. Such agreement shall be effective immediately and will be followed with a change order at such time as the actual adjustments are determined.

7.3.5 If Contractor does not agree to the adjustment of the Contract Sum set forth in a field order, Owner's Representative shall determine the adjustment of the Contract Sum in accordance with the provisions of Paragraphs 7.2.4.

7.4 LETTERS OF INSTRUCTION

7.4.1 Owner's Representative may issue letters of instruction which make interpretations or clarifications of the Contract Documents that do not change the scope of Work or involve an adjustment of the Contract Sum or the Contract Time and that are consistent with the intent of the Contract Documents. Letters of instruction shall be binding upon Contractor. Contractor shall promptly carry out the requirements of such letters of instruction.

ARTICLE 8

CONTRACT TIME

8.1 COMMENCEMENT OF THE WORK

8.1.1 The date of commencement of the Work shall be set forth in the notice to proceed. The date of commencement of the Work shall not be postponed by the failure of Contractor, or of persons or firms for whom Contractor is responsible, to act.

8.2 PROGRESS AND COMPLETION

8.2.1 By signing the Contract Agreement, Contractor represents to Owner that the Contract Time is reasonable for performing the Work and that Contractor is able to perform the Work within the Contract Time.

8.2.2 Contractor shall not, except by agreement or instruction of Owner's Representative in writing, commence operations on the Project site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by Contractor. The

dates of commencement and completion of the Work shall not be changed by the effective date of such insurance.

8.2.3 Contractor shall proceed expeditiously with adequate forces and shall achieve Final Completion within the Contract Time. If Contractor is not diligently proceeding with the prosecution of the Work as scheduled, Contractor shall, immediately and at no additional cost to Owner, take all measures necessary, including working such overtime, additional shifts, Sundays, or holidays, as may be required to correct said delays and to ensure no further delays to the completion of the Work.

8.3 DELAY

8.3.1 As used herein, the following terms shall have the following meanings:

- .1** "Excusable Delay" means any delay of the completion of the Work beyond the expiration of the Contract Time caused by conditions beyond the control and without the fault or negligence of Contractor such as embargoes, fire, unavoidable casualties, unusual delays in transportation, national emergency, and abnormal stormy and inclement weather conditions in which the Work cannot continue. The financial inability of Contractor or any Subcontractor and any default of any Subcontractor, without limitation, shall not be deemed conditions beyond Contractor's control. An Excusable Delay may entitle Contractor to an extension of the Contract Time, in accordance with Paragraphs 7.1.3 and 8.3.2, but shall not entitle Contractor to any adjustment of the Contract Sum.
- .2** "Compensable Delay" means any delay of the completion of the Work beyond the expiration date of the Contract Time caused by the gross negligence or willful acts of Owner or Owner's Representative, and which delay is unreasonable under the circumstances involved and not within the contemplation of the parties. A Compensable Delay may entitle Contractor to an extension of the Contract Time, in accordance with Paragraph 8.3.2 and subject to Paragraph 7.1.3, and/or an adjustment of the Contract Sum, in accordance with Paragraph 8.3.3. Except as provided herein, Contractor shall have no Claim for damage or compensation for any delay, interruption, hindrance, or disruption.
- .3** "Unexcusable Delay" means any delay of the completion of the Work beyond the expiration of the Contract Time resulting from causes other than those listed in Subparagraphs 8.3.1.1 and 8.3.1.2. An Unexcusable Delay shall not entitle Contractor to an extension of the Contract Time or an adjustment of the Contract Sum.

8.3.2 CLAIMS FOR ADJUSTMENT OF THE CONTRACT TIME FOR DELAYS.

Contractor may make a Claim for an extension of the Contract Time, for an Excusable Delay or a Compensable Delay, subject to the following:

- .1 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.
- .2 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, by which the Excusable Delay or the Compensable Delay exceeds the Unexcusable Delay.
- .3 If an Unexcusable Delay occurs concurrently with both an Excusable Delay and a Compensable Delay, the maximum extension of the Contract Time shall be the number of days, if any, by which the number of days determined pursuant to Subparagraph 8.3.2.1 exceeds the number of days of the Unexcusable Delay.

8.3.3 CLAIMS FOR ADJUSTMENT OF THE CONTRACT SUM FOR DELAYS. For a Compensable Delay, Contractor shall only be entitled to an adjustment of the Contract Sum in an amount equal to the sum of the following:

- .1 Actual and unavoidable additional costs of labor, material, and equipment provided by Contractor at the Project site as a result of the Compensable Delay,
- .2 plus actual and unavoidable additional costs incurred by Contractor for labor, material, and equipment provided by Subcontractors as a result of the Compensable Delay,
- .3 plus actual and unavoidable additional wages or salaries and fringe benefits and payroll taxes of supervisory and administrative personnel provided by Contractor and Subcontractors at the Project site as a result of the Compensable Delay,
- .4 plus the amount of the Contractor fee determined by applying the provisions of Paragraph 7.2.4 to the sum of items .1, .2, and .3 above.

To be entitled to an adjustment of the Contract Sum for Compensable Delay, Contractor shall comply with the provisions of Sections 4.2 through 4.5. Except as provided herein, Contractor shall have no Claim for damage or compensation for any delay, interruption, hindrance, or disruption.

8.3.4 The parties agree that Owner's exercise of its rights to order changes in the Work, regardless of the extent and number of changes, or to suspend the Work, is within the

contemplation of the parties and shall not be the basis for any Claim for Compensable Delay. The rights of Contractor to adjustments of the Contract Time and the Contract Sum, based on changes ordered in the Work or suspension of the Work, shall be solely governed by the provisions of Articles 7 and 13, respectively.

8.3.5 The determination of whether a delay is an Excusable Delay, Compensable Delay, or Unexcusable Delay shall not be affected by the fact that any earlier delay occurred, regardless of fault or causation.

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 COST BREAKDOWN

9.1.1 Within thirty (30) days after signing the Contract Agreement, but in any event prior to the first partial payment request, Contractor shall submit to Owner's Representative a cost breakdown of the Contract Sum in the form contained in the partial payment request in the exhibits. The cost breakdown shall itemize as separate line items the cost of each Work activity and all other costs, including warranties, record documents, insurance, bonds, overhead expenses, and the total allowance for profit, the total of which shall equal the Contract Sum. The cost breakdown, when approved by Owner, shall become the basis for determining the cost of Work performed for Contractor's partial payment requests.

9.2 PARTIAL PAYMENT

9.2.1 Owner agrees to pay monthly to Contractor, subject to Paragraph 9.4.2, an amount equal to ninety percent (90%) of the sum of the following:

- .1 Cost of the Work in permanent place as of the end of the preceding month,
- .2 plus cost of materials not yet incorporated in the Work, subject to Paragraph 9.3.5,
- .3 less amounts previously paid.

9.2.2 The balance of the Contract Sum shall be paid after Final Completion in accordance with Section 9.7.

9.3 PARTIAL PAYMENT REQUEST

9.3.1 On or before the tenth (10th) day of the month or such other date as is established by the Contract Documents, Contractor shall submit to Owner's Representative an itemized partial payment request for the cost of the Work in

permanent place, as approved by Owner's Representative, which has been completed in accordance with the Contract Documents as of the last day of the preceding month, less amounts previously paid. The partial payment request shall be prepared as follows:

- .1 Use the form acceptable to the Owner.
- .2 Itemize in accordance with the cost breakdown.
- .3 Include such data substantiating Contractor's right to payment as Owner's Representative may reasonably require, such as invoices, certified payrolls, daily time and material records, and, if securities are deposited in lieu of retention pursuant to Section 9.5, a certification of the market value of all such securities as of a date not earlier than five (5) days prior to the date of the partial payment request.
- .4 Itemize retention.

9.3.2 Partial payment requests shall not include requests for payment on account of (1) changes which have not been authorized by change orders or (2) amounts Contractor does not intend to pay a Subcontractor because of a dispute or other reason.

9.3.3 If required by Owner, a partial payment request shall be accompanied by (1) a summary showing payments that will be made to Subcontractors covered by such request and (2) unconditional waivers and releases of Claims and stop notices from each Subcontractor listed in the preceding partial payment request covering sums disbursed pursuant to that preceding partial payment request.

9.3.4 Contractor warrants that, upon submittal of a partial payment request, all Work for which partial payment authorizations have been previously issued and payment has been received from Owner shall be free and clear of all Claims, stop notices, security interests, and encumbrances in favor of Contractor, Subcontractors, or other persons or firms entitled to make Claims by reason of having provided labor, materials, or equipment relating to the Work.

9.3.5 At the sole discretion of Owner, Owner's Representative may approve for inclusion in the partial payment request the cost of materials not yet incorporated in the Work but already delivered and suitably stored either at the Project site or at some other appropriate location acceptable to Owner's Representative. In such case, Contractor shall furnish evidence satisfactory to Owner's Representative (1) of the cost of such materials and (2) that such materials are under the exclusive control of Contractor. Only materials to be incorporated in the Work will be considered for payment. Any payment shall not be construed as acceptance of such materials nor relieve Contractor from sole responsibility for the care and protection of such materials; nor relieve Contractor from risk of loss to such materials from any cause whatsoever; nor relieve Contractor from its obligation to complete the Work in accordance with the Contract

Documents; nor act as a waiver of the right of Owner to require fulfillment of all terms of the Contract Agreement.

9.4 PARTIAL PAYMENT AUTHORIZATION

9.4.1 If Contractor has submitted a partial payment request in accordance with Section 9.3, Owner's Representative shall, not later than five (5) working days after the date of receipt of the partial payment request, issue to Owner, with a copy to Contractor, a partial payment authorization for such amount as Owner's Representative determines to be properly due.

9.4.2 Approval of all or any part of a partial payment request may be withheld, a partial payment authorization may be withheld, and all or part of a previous partial payment authorization may be nullified and that amount withheld from a current partial payment authorization on account of any of the following:

- .1 Defective work not remedied.
- .2 Third-party claims against Contractor or Owner arising from the acts or omissions of Contractor or Subcontractors.
- .3 Stop notices.
- .4 Failure of Contractor to make timely payments due Subcontractors for material or labor.
- .5 A reasonable doubt that the Work can be completed for the balance of the Contract Sum then unpaid.
- .6 Damage to Owner or a separate contractor for which Contractor is responsible.
- .7 Reasonable evidence that the Work will not be completed within the Contract Time; and that the unpaid balance of the Contract Sum would not be adequate to cover Owner's damages for the anticipated delay.
- .8 Failure of Contractor to maintain and update record documents.
- .9 Failure of Contractor to submit schedules or their updates as required by the Contract Documents.
- .10 Performance of Work by Contractor without properly processed Shop Drawings.
- .11 Liquidated damages assessed in accordance with Article 4 of the Contract Agreement.

- .12 Any other failure of Contractor to perform its obligations under the Contract Documents.

9.4.3 Subject to the withholding provisions of Paragraph 9.4.2, Owner shall pay Contractor the amount set forth in the partial payment authorization no later than fifteen (15) days after the issuance of the partial payment authorization.

9.4.4 Neither a partial payment authorization nor any partial payment made by Owner shall constitute acceptance of defective work.

9.6 BENEFICIAL OCCUPANCY

9.6.1 Owner reserves the right, at its option and convenience, to occupy or otherwise make use of all or any part of the Work at any time prior to Final Completion upon ten (10) days' notice to Contractor. Such occupancy or use is herein referred to as "Beneficial Occupancy." Beneficial Occupancy shall be subject to the following conditions:

- .1 Owner's Representative will make an inspection of the portion of the Project to be beneficially occupied and prepare a list of items to be completed or corrected prior to Final Completion. Prior to Beneficial Occupancy, Owner will issue a certificate of Beneficial Occupancy on Owner's form.
- .2 Beneficial Occupancy by Owner shall not be construed by Contractor as an acceptance by Owner of that portion of the Work which is to be occupied.
- .3 Beneficial Occupancy by Owner shall not constitute a waiver of existing Claims of Owner or Contractor against each other.
- .4 The guarantee to repair periods, as defined in Section 12.2, will commence upon the first dates of actual occupancy or use of portions of the Work actually occupied and equipment or systems fully utilized.
- .5 Owner shall pay all normal operating and maintenance costs resulting from its use of equipment in areas beneficially occupied.
- .6 Owner shall pay all utility costs which arise out of the Beneficial Occupancy.
- .7 Contractor shall not be responsible for providing security in areas beneficially occupied.
- .8 Contractor shall continue to maintain all insurance required by the Contract Documents in full force and effect.

9.7 FINAL COMPLETION AND FINAL PAYMENT

9.7.1 Upon receipt of notice from Contractor that the Work is ready for final inspection, Owner's Representative will make such inspection. Final Completion shall be when Owner's Representative determines that the Work is fully completed and in accordance with the Contract Documents. Owner will file a notice of completion within ten (10) days after Final Completion. After receipt of the final payment request, if Owner's Representative determines that Final Completion has occurred, Owner's Representative will issue the final authorization for payment.

9.7.2 Neither final payment nor any retention shall become due until Contractor submits the following items to Owner's Representative:

- .1 The final payment request and all submittals required by Section 9.3 and the Contract Documents.
- .2 If required by Owner, conditional releases from Subcontractors entitled to receive any portion of the final payment and unconditional releases from Contractor, such releases to be in a form satisfactory to Owner.
- .3 All guarantees and warranties procured by Contractor from Subcontractors, all operating manuals for equipment installed in the Project, record documents, and all other submittals required by the Contract Documents.
- .4 Contractor has furnished to Owner written consent from the performance bond and payment bond sureties to such release of retention.

If releases are required, Contractor shall pay or cause to be paid to Subcontractors the amount stated in the conditional releases within five (5) days after receipt of the final payment, and shall promptly thereafter furnish evidence of such payment to Owner. If Owner does not require releases, the final payment shall be made, subject to the satisfaction of all other conditions to final payment, thirty-five (35) days after the filing of the notice of completion.

9.7.3 Acceptance of final payment by Contractor shall constitute a waiver of all Claims, except those previously made in writing and identified by Contractor as unsettled at the time of the final payment request.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract Documents.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 Contractor shall take adequate precautions for safety of persons and property and shall provide adequate protection to prevent damage, injury, or loss to the following:

- .1 Employees involved in the Work and other persons who may be affected thereby.
- .2 The Work in place and materials and equipment to be incorporated therein, whether in storage on or off the Project site, under care, custody, or control of Contractor or Subcontractors.
- .3 Other property at the Project site and adjoining property.

10.2.2 Contractor shall erect and maintain, as required by existing conditions and performance of the Work, adequate safeguards for safety and protection, including providing adequate lighting and ventilation, posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying Owner and users of adjacent sites and utilities.

10.2.3 When use or storage of explosives, other hazardous materials, equipment, or unusual methods is necessary for execution of the Work, Contractor shall exercise the utmost care and carry on such activities only under the supervision of properly qualified personnel.

10.2.4 Contractor shall designate a responsible member of Contractor's organization at the Project site whose duty shall be the prevention of accidents. That person shall be the Contractor's superintendent, unless otherwise designated by Contractor in writing to Owner and Owner's Representative.

10.2.5 Contractor shall not load or permit any part of the Work or the Project site to be loaded so as to endanger the safety of persons or property.

10.3 EMERGENCIES

10.3.1 In an emergency affecting the safety of persons or property, Contractor shall act to prevent or minimize damage, injury, or loss. Contractor shall promptly notify Owner's Representative, which notice may be oral followed by written confirmation, of the occurrence of such an emergency and Contractor's action.

ARTICLE 11

INSURANCE AND BONDS

11.1 LIABILITY INSURANCE

11.1.1 Contractor shall, at its expense, purchase and maintain in full force and effect such insurance as will protect itself and Owner, Owner's boards and commissions and members thereof, and Owner's officers, employees and agents from Claims, such as for bodily injury, death, and property damage, which may arise out of or result from the Work required by the Contract Documents, whether such Work is done by Contractor, by any Subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

11.1.2 The following liability policies and coverages shall be furnished by Contractor:

- .1 COMPREHENSIVE OR COMMERCIAL FORM GENERAL LIABILITY INSURANCE in the amount of at least One Million Dollars (\$1,000,000) combined single limit for each occurrence, and Two Million Dollars (\$2,000,000) in the aggregate, with a maximum policy deductible of \$500, covering all Work done by or on behalf of Contractor and providing insurance for bodily injury, personal injury, property damage, and contractual liability. Except with respect to bodily injury and property damage included within the products and completed operations hazards, the aggregate limit shall apply separately to Work required of Contractor by these Contract Documents. However, if the insurance under this Subparagraph 11.1.2.1 is written on a claims-made form, coverage shall survive for a period of not less than three (3) years following termination of the Contract Agreement. Coverage shall provide for a retroactive date of placement coinciding with the effective date of the Contract Agreement.
- .2 BUSINESS AUTOMOBILE LIABILITY INSURANCE on an "Occurrence" form in the amount of at least One Million Dollars (\$1,000,000), and Two Million Dollars (\$2,000,000) in the aggregate and covering owned, hired, leased, and non-owned automobiles used by or on behalf of Contractor and providing insurance for bodily injury and property damage.

11.1.3 Contractor's liability insurance as required by Paragraph 11.1.2 shall, by endorsement to the policies, include the following:

- .1 An additional insured provision stating that Owner, Owner's boards and commissions and members thereof, and Owner's officers, employees and agents are covered as insureds with respect to liabilities arising out of work or operations performed by or on behalf of the Contractor, including materials, parts, or equipment furnished in connection with such work or operations, and with respect to liability arising out of automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor. However, coverage shall not extend to indemnity for the active negligence of the additional insureds in any case where an agreement to indemnify the additional insureds would be invalid under Subdivision (b) of Section 2782 of the California Civil Code.
- .2 A severability of interest clause stating that, "The term 'insured' is hereby used severally and not collectively, but the inclusion herein of more than one insured shall not operate to increase the limits of the insurers' liability."
- .3 A cross-liability clause stating that, "In the event of claims being made under any of the coverages of the policies referred to herein by one or more insureds hereunder for which another insured hereunder may be liable, then the policies shall cover such insureds against whom a claim is made or may be made in the same manner as if separate policies had been issued to each insured hereunder. Nothing contained herein, however, shall operate to increase the insurers' limits of liability as set forth in the insuring agreements."
- .4 A provision stating that Owner, Owner's boards, commissions and members thereof, and Owner's officers, employees and agents shall not by reason of their inclusion as insureds incur liability to the insurance carriers for payment of premiums for such insurance.
- .5 A provision stating that the coverage provided by such insurance shall be primary and not in excess of or contributing with respect to any insurance, indemnity coverage afforded by a risk pool, or self-insurance maintained by Owner, Owner's board, commissions and members thereof, or Owner's officers, employees and agents. This provision, however, shall only apply as per the stipulations of Subparagraph 11.1.3.1.
- .6 A provision stating that the coverage provided by such insurance shall not be subject to cancellation or modification without thirty (30) days' prior written notice to Owner.

11.1.4 Certificates of insurance evidencing the insurance policies required by this Section 11.1, as well as copies of all endorsements to such policies required by Paragraph 11.1.3, shall be submitted by Contractor to Owner prior to commencing Work on the Project. However, acceptance of such certificates of insurance and endorsement by Owner shall not in any way limit Contractor's liabilities under the Contract Documents.

At the request of Owner, Contractor shall also submit to Owner copies of the insurance policies obtained by Contractor.

11.1.5 In the event Contractor does not comply with these insurance requirements, Owner may, at its option, provide insurance coverage to protect Owner, Owner's boards, commissions and members thereof, and Owner's officers, employees and agents; and the cost of such insurance shall be paid by Contractor and may be deducted from the Contract Sum.

11.1.6 Contractor shall, by mutual agreement with Owner and at Owner's cost, furnish any additional liability insurance as may be required by Owner. Contractor shall provide certificates of insurance evidencing such additional insurance.

11.2 WORKER'S COMPENSATION INSURANCE

11.2.1 Contractor shall, at its expense, purchase and maintain in full force and effect worker's compensation insurance as required by Federal and State of California law. A certificate of insurance or other documentation acceptable to Owner evidencing such insurance coverage shall be provided by Contractor to Owner prior to commencing Work on the Project. Contractor shall also require all of its Subcontractors to maintain this insurance coverage.

11.3 MISCELLANEOUS INSURANCE PROVISIONS

11.3.1 Any insured loss is to be adjusted with Owner and made payable to Owner on behalf of the insureds, as their interests may appear. Owner shall have the power to adjust and settle any loss with the insurers unless, within five (5) working days after the loss, one of the parties in interest shall object in writing to Owner's exercise of this power; and if such objection be made, the matter shall be subject to resolution as provided in Article 4.

11.4 PERFORMANCE BOND AND PAYMENT BOND

11.4.1 Contemporaneous with the execution of the Contract Agreement, and before commencement of any Work required by the Contract Documents, Contractor shall provide Owner with separate payment and performance bonds, each in a sum at least equal to the Contract Sum. These bonds will be provided on forms acceptable to Owner and who are listed in the Federal Register as published by the U.S. Department of Treasury under the most recently revised Circular. In addition, each surety company shall be admitted and licensed to do business in the State of California and have a minimum A.M. Best Company's Insurance Report Rating of A or A- (Excellent.)

11.4.2 If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business in California terminated, Contractor shall, within five (5) days thereafter, substitute another surety and bond, both of which shall be acceptable to Owner.

ARTICLE 12

UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

12.1.1 All Work shall be inspected by Owner's Representative before being covered. If any Work is covered before it has been inspected, such Work must, upon written request by Owner's Representative, be uncovered for Owner's Representative's observation and be replaced at Contractor's expense without adjustment of the Contract Time or the Contract Sum.

12.2 CORRECTION OF DEFECTIVE WORK AND GUARANTEE TO REPAIR PERIOD

12.2.1 The term "Guarantee to Repair Period" means a period of one (1) year, unless a longer period of time is specified in the Contract Agreement or Supplementary Conditions, commencing as follows:

- .1 For space beneficially occupied or for separate systems fully utilized prior to Final Completion pursuant to Section 9.6, from the first date of such Beneficial Occupancy or actual use, as established in a certificate of Beneficial Occupancy.
- .2 For all Work other than .1 above, from the date of Final Completion.

12.2.2 Contractor shall (1) correct defective work that becomes apparent during the progress of the Work or during the Guarantee to Repair Period and (2) replace, repair, or restore to Owner's satisfaction any other parts of the Work and any other real or personal property which is damaged or destroyed as a result of defective work or the correction of defective work. Contractor shall promptly commence such correction, replacement, repair, or restoration upon notice from Owner's Representative or Owner, but in no case later than ten (10) days after receipt of such notice; and Contractor shall diligently and continuously prosecute such correction to completion. Contractor shall bear all costs of such correction, replacement, repair, or restoration, and all losses resulting from such defective work, including additional testing, inspection, and compensation for Owner's Representative's services and expenses. Contractor shall perform corrective work at such times that are acceptable to Owner and in such a manner as to avoid, to the extent practicable, disruption to Owner's activities.

12.2.3 If immediate correction of defective work is required for life safety or the protection of property and is performed by Owner or separate contractors, Contractor shall pay to Owner all reasonable costs of correcting such defective work. Contractor shall replace, repair, or restore to Owner's satisfaction any other parts of the Work and any other real or personal property which is damaged or destroyed as a result of such defective work or the correction of such defective work.

12.2.4 Contractor shall remove from the Project site portions of the Work and materials which are not in accordance with the Contract Documents and which are neither corrected by Contractor nor accepted by Owner.

12.2.5 If Contractor fails to commence correction of defective work within ten (10) days after notice from Owner or Owner's Representative or fails to diligently prosecute such correction to completion, Owner may correct the defective work in accordance with Section 2.4; and, in addition, Owner may remove the defective work and store salvageable materials and equipment at Contractor's expense.

12.2.6 If Contractor fails to pay the costs of such removal and storage as required by Paragraphs 12.2.4 and 12.2.5 within ten (10) days after written demand, Owner may, without prejudice to other remedies, sell such materials at auction or at private sale, or otherwise dispose of such material. Contractor shall be entitled to the proceeds of such sale, if any, in excess of the costs and damages for which Contractor is liable to Owner, including reasonable attorneys' fees and expenses and compensation for Owner's Representative's services and expenses. If such proceeds of sale do not cover costs and damages for which Contractor is liable to Owner, the Contract Sum shall be reduced by such deficiency. If there are no remaining payments due Contractor or the remaining payments are insufficient to cover such deficiency, Contractor shall promptly pay the difference to Owner.

12.2.7 Contractor's obligations under this Article 12 are in addition to and not in limitation of its warranty under Section 3.4 or any other obligation of Contractor under the Contract Documents. Enforcement of Contractor's express warranties and guarantees to repair contained in the Contract Documents shall be in addition to and not in limitation of any other rights or remedies Owner may have under the Contract Documents or at law or in equity for defective work. Nothing contained in this Article 12 shall be construed to establish a period of limitation with respect to other obligations of Contractor under the Contract Documents. Establishment of the Guarantee to Repair Period relates only to the specific obligation of Contractor to correct the Work and in no way limits either Contractor's liability for defective work or the time within which proceedings may be commenced to enforce Contractor's obligations under the Contract Documents.

12.3 ACCEPTANCE OF DEFECTIVE WORK

12.3.1 Notwithstanding the provisions of Section 12.2, Owner shall have the option, at its sole discretion and by notice to Contractor, to accept defective work instead of requiring its removal or correction, in which case the Contract Sum shall be reduced by an amount equal to the difference between the value to Owner such Work would have had were it complete, correct, and in conformity with the Contract Documents and the value to Owner of such defective work. Such option shall be exercised solely by notice to Contractor and shall not be implied from any act or omission by Owner or Owner's Representative. If there are no remaining payments of the Contract Sum to be made to Contractor or if the remaining payments and retention are insufficient to cover the

amount of the reduction of the Contract Sum, Contractor shall promptly pay to Owner the amount of any such deficiency.

ARTICLE 13

TERMINATION OR SUSPENSION OF THE CONTRACT

13.1 TERMINATION BY CONTRACTOR

13.1.1 Subject to Paragraph 13.1.2, Contractor shall have the right to terminate the Contract Agreement only upon the occurrence of one of the following:

- .1 The Work is stopped for ninety (90) consecutive days, through no act or fault of Contractor, any Subcontractor, or any employee or agent of Contractor or any Subcontractor, due to an issuance of an order of a court or other public authority having jurisdiction or due to an act of government, such as a declaration of a national emergency making material unavailable.
- .2 Owner fails to perform any material obligation under the Contract Documents and fails to cure such default within thirty (30) days after receipt of notice from Contractor stating the nature of such default.
- .3 Repeated suspensions by Owner, other than such suspensions as are agreed to by Contractor under Section 13.3, which constitute in the aggregate more than twenty percent (20%) of the Contract Time or ninety (90) days, whichever is larger.

13.1.2 Upon the occurrence of one of the events listed in Paragraph 13.1.1, Contractor may, upon ten (10) days' additional notice to Owner and Owner's Representative, and provided that the condition giving rise to Contractor's right to terminate is continuing, terminate the Contract Agreement.

13.1.3 Upon termination by Contractor, Owner shall pay to Contractor the sum determined by Paragraph 13.4.4. Such payment shall be the sole and exclusive remedy to which Contractor is entitled in the event of termination of the Contract Agreement by Contractor pursuant to Section 13.1; and Contractor will be entitled to no other compensation or damages and expressly waives the same.

13.2 TERMINATION BY OWNER FOR CAUSE

13.2.1 Owner shall have the right to terminate the Contract Agreement for cause at any time after the occurrence of any of the following events:

- .1 Contractor becomes insolvent or files for relief under the bankruptcy laws of the United States.

- .2 Contractor makes a general assignment for the benefit of its creditors or fails to pay its debts as the same become due.
- .3 A receiver is appointed to take charge of Contractor's property.
- .4 The commencement or completion of any Work activity is fourteen (14) days or more behind the date set forth in the contract schedule for such Work activity, and which results in an Unexcusable Delay.
- .5 Contractor abandons the Work.

13.2.2 Upon the occurrence of any of the following events, Owner shall have the right to terminate the Contract Agreement for cause if Contractor fails to promptly commence to cure such default and diligently prosecute such cure within five (5) days after notice from Owner, or within such longer period of time as is reasonably necessary to complete such cure:

- .1 Contractor persistently or repeatedly refuses or fails to supply skilled supervisory personnel, an adequate number of properly skilled workers, proper materials, or necessary equipment to prosecute the Work in accordance with the Contract Documents.
- .2 Contractor fails to make prompt payment of amounts properly due Subcontractors after receiving payment from Owner.
- .3 Contractor disregards Applicable Code Requirements.
- .4 Contractor persistently or materially fails to execute the Work in accordance with the Contract Documents.
- .5 Contractor is in default of any other material obligation under the Contract Documents.
- .6 Any legal proceeding is commenced against Contractor which, in the opinion of Owner's Representative, may interfere with the performance of the Work.
- .7 In the event Contractor is involved in a labor dispute which threatens the progress or cost of Work, or which disrupts Owner's operations, Owner may suspend or discontinue the Work of Contractor or any Subcontractor, or terminate the Contract Agreement for cause.

13.2.3 Upon any of the occurrences referred to in Paragraphs 13.2.1 and 13.2.2, Owner may, at its election and by notice to Contractor, terminate the Contract Agreement and take possession of the Project site and all materials, supplies, equipment, tools, and construction equipment and machinery thereon owned by Contractor; accept the

assignment of any or all of the subcontracts; and then complete the Work by any method Owner may deem expedient. If requested by Owner, Contractor shall remove any part or all of Contractor's materials, supplies, equipment, tools, and construction equipment and machinery from the Project site within seven (7) days of such request; and if Contractor fails to do so, Owner may remove or store, and after ninety (90) days sell, any of the same at Contractor's expense.

13.2.4 If the Contract Agreement is terminated by Owner as provided in this Section 13.2, Contractor shall not be entitled to receive any further payment until the expiration of thirty-five (35) days after Final Completion and acceptance of all Work by Owner.

13.2.5 If the unpaid balance of the Contract Sum exceeds the cost of completing the Work, including all additional costs and expenses made necessary thereby, plus all losses sustained, including any liquidated damages provided under the Contract Documents, such excess shall be paid to Contractor. If such costs, expenses, losses, and liquidated damages exceed the unpaid balance of the Contract Sum, Contractor shall pay such excess to Owner.

13.2.6 No termination shall impair Owner's rights under the performance bond and payment bond required under Section 11.4. No termination or action taken by Owner after termination shall prejudice any other rights or remedies of Owner provided by law or by the Contract Documents upon such termination; and Owner may proceed against Contractor and/or against the surety companies who provided the performance bond and payment bond required under Section 11.4 to recover all losses suffered by Owner.

13.3 *SUSPENSION BY OWNER FOR CONVENIENCE*

13.3.1 Owner may, at any time and from time to time, without cause, order Contractor, in writing, to suspend, delay, or interrupt the Work in whole or in part for such period of time, up to ninety (90) days, as Owner may determine, with such period of suspension to be computed from the date of delivery of the written order. Such order shall be specifically identified as a "Suspension Order" under this Section 13.3. The Work may be stopped for such further period as the parties may agree. Upon receipt of a Suspension Order, Contractor shall, at Owner's expense, comply with its terms and take all reasonable steps to minimize costs allocable to the Work covered by the Suspension Order during the period of Work stoppage. Within ninety (90) days after the issuance of the Suspension Order, or such extension to that period as is agreed upon by Contractor and Owner, Owner shall either cancel the Suspension Order or delete the Work covered by such Suspension Order by issuing a change order.

13.3.2 If a Suspension Order is canceled or expires, Contractor shall continue with the Work. A change order will be issued to cover any adjustments of the Contract Sum or the Contract Time necessarily caused by such suspension. Any Claim by Contractor for an adjustment of the Contract Sum or the Contract Time shall be made within twenty-one (21) days after the end of the Work suspension.

13.3.3 The provisions of this Section 13.3 shall not apply if a Suspension Order is not issued by Owner. A Suspension Order shall not be required to stop the Work as permitted or required under any other provision of the Contract Documents.

13.4 TERMINATION BY OWNER FOR CONVENIENCE

13.4.1 Owner may, at its option, terminate this Contract Agreement, in whole or from time to time in part, at any time by giving notice to Contractor. Upon such termination, Contractor agrees to waive any Claims for damages, including loss of anticipated profits, on account thereof; and, as the sole right and remedy of Contractor, Owner shall pay Contractor in accordance with Paragraph 13.4.4.

13.4.2 Upon receipt of a notice of termination under this Section 13.4, Contractor shall, unless the notice directs otherwise, do the following:

- .1 Immediately discontinue the Work to the extent specified in the notice.
- .2 Place no further orders or subcontracts for materials, equipment, services, or facilities, except as may be necessary for completion of such portion of the Work as is not discontinued.
- .3 Promptly cancel, on the most favorable terms reasonably possible, all subcontracts to the extent they relate to the performance of the discontinued portion of the Work.
- .4 Thereafter do only such Work as may be necessary to preserve and protect Work already in progress and to protect materials, plants, and equipment on the Project site or in transit thereto.
- .5 Leave the Project site in a safe condition.

13.4.3 Upon termination of the Contract Agreement, the obligations of the Contract Documents shall continue as to portions of the Work already performed and, subject to Contractor's obligations under Paragraph 13.4.2, as to bona fide obligations assumed by Contractor prior to the date of termination.

13.4.4 Upon such termination, Owner shall pay to Contractor the sum of the following:

- .1 The amount of the Contract Sum allocable to the portion of the Work properly performed by Contractor as of the date of termination, less sums previously paid to Contractor,
- .2 plus an amount equal to the lesser of Fifty Thousand Dollars (\$50,000) or five percent (5%) of the difference between the Contract Sum and the amount of the Contract Sum allocable to the portion of the Work properly performed by Contractor as of the date of termination,

- .3 plus previously unpaid costs of any items delivered to the Project site which were fabricated for subsequent incorporation in the Work,
- .4 plus any proven losses with respect to materials and equipment directly resulting from such termination,
- .5 plus reasonable demobilization costs.

The above payment shall be the sole and exclusive remedy to which Contractor is entitled in the event of termination of the Contract Agreement by Owner pursuant to Section 13.4; and Contractor will be entitled to no other compensation or damages and expressly waives same.

ARTICLE 14

NOT USED

ARTICLE 15

MISCELLANEOUS PROVISIONS

15.1 GOVERNING LAW

15.1.1 The Contract Agreement and all of the Contract Documents incorporated into the Contract Agreement shall be interpreted under and governed by the laws of the State of California.

15.2 SUCCESSORS AND ASSIGNS

15.2.1 Owner and Contractor respectively bind themselves and their successors, permitted assigns, and legal representatives to the other party and to the successors, permitted assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract Agreement shall assign the Contract Agreement, in whole or in part, without prior written consent of the other party. Notwithstanding any such assignment, each of the original contracting parties shall remain legally responsible for all of its obligations under the Contract Documents.

15.3 RIGHTS AND REMEDIES

15.3.1 All Owner's rights and remedies under the Contract Documents shall be cumulative and in addition to and not in limitation of all other rights and remedies of Owner under the Contract Documents or otherwise available at law or in equity.

15.3.2 No action or failure to act by Owner or Owner's Representative shall constitute a waiver of a right afforded them under the Contract Documents, nor shall such action or

failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing. No waiver by Owner or Owner's Representative of any breach or default shall constitute a waiver of any other breach or default; nor shall any such waiver constitute a continuing waiver.

15.3.3 No provision contained in the Contract Documents shall create or give to third parties any Claim or right of action against Owner, Owner's Representative, or Contractor.

15.4 SURVIVAL

15.4.1 The provisions of the Contract Documents which by their nature survive termination of the Contract Agreement or Final Completion, including all warranties, indemnities, payment obligations, and Owner's right to audit Contractor's books and records, shall remain in full force and effect after Final Completion or any termination of the Contract.

15.5 COMPLETE AGREEMENT

15.5.1 The Contract Documents constitute the full and complete understanding of the parties and supersede any previous agreements or understandings, oral or written, with respect to the subject matter hereof. The Contract Documents may be modified only by a written instrument signed by both parties or as provided in Article 7.

15.6 SEVERABILITY OF PROVISIONS

15.6.1 If any one or more of the provisions contained in the Contract Documents should be invalid, illegal, or unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

15.7 OWNER'S RIGHT TO AUDIT

15.7.1 Owner and entities and agencies designated by Owner shall have access to and the right to audit and copy at Owner's cost all of Contractor's books, records, contracts, correspondence, instructions, drawings, receipts, vouchers, purchase orders, and memoranda relating to the Work. Contractor shall preserve all such records and other items for a period of at least three (3) years after Final Completion.

15.8 NOTICES

15.8.1 Except as otherwise provided, all notices, requests, demands, and other communications to be given under the Contract Documents shall be in writing and shall be transmitted by one of the following methods:

- .1 Personally delivered.

- .2 Sent by telecopy where receipt is confirmed.
- .3 Sent by courier where receipt is confirmed.
- .4 Sent by registered or certified mail, postage prepaid, return receipt requested.

Such notices and other communications shall be deemed given and received upon actual receipt in the case of all except registered or certified mail; and, in the case of registered or certified mail, on the date shown on the return receipt or the date delivery during normal business hours was attempted. Such notices and communications shall be given at the respective street addresses set forth in such Contract Documents. Such street addresses may be changed by notice given in accordance with this Section 15.8.

15.9 TIME OF THE ESSENCE

15.9.1 Time limits stated in the Contract Documents are of the essence of the Contract Agreement.

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Access to site.
5. Coordination with occupants.
6. Work restrictions.
7. Specification and drawing conventions.

1.2 PROJECT INFORMATION

A.

Project Identification:

REROOF/ HVAC at CARD Center.

Project Location: ***545 Vallombrosa, Chico, CA 95926***

B. Owner: CHICO AREA RECREATION DISTRICT.

1. Owner's Representative: ***Ann Willman, General Manager.***

C. Architect: Larry E. Coffman, Senior Architect, **NorthStar.**

D. Contractor: To Be Determined

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents and consists of the following:

1. *The existing building is a wood frame single story heavy timber roof w/ a combination of "flat" roofs and composition shingled gable and hip roofs. Refer to Construction Document prepared by NorthStar. This project consists of demolition and disposal of the existing TPO roof membrane and existing EPS rigid insulation on the flat roofs; the existing gypsum board under the insulation is to remain; removal and disposal of the existing wood siding and wood trim as detailed in the Construction Documents.*

*Install a watertight single-ply mechanically attached TPO roof membrane over new **tapered** poly-isocyanurate rigid insulation over the existing gypsum*

*board/wood decking, providing drainage to existing gutters or onto existing composition shingle roofs. To facilitate the new roof installation, the existing rooftop package units will be removed, relocated and reinstalled on metal platform frames that will allow roof drainage to flow unimpeded under the units. New above roof high efficiency ductwork shall be fabricated and installed to connect to existing interior exposed ducts per the Construction Documents. Existing electrical power and control wiring shall be **extended, per code**, to the new HVAC unit locations. Natural gas and condensation piping shall be modified as necessary and reconnected at their new locations.*

B. Type of Contract.

1. Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

- A. General: Contractor shall have use of Project site for construction operations during construction period. Contractor's use of Project site is limited by the continued occupancy and use of the building throughout the project. The General Contractor shall cooperate with the Owner to facilitate their continued use and access to and from the building.
- B. Safety of Occupants: The General Contractor shall be fully responsible to protect the building/site occupants and users during their use of the site and the building. Staging of project materials shall be done only in consultation and agreement with the Owner.

1.5 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and the existing building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 2. Notify the Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.6 WORK RESTRICTIONS – Refer to Section 015000

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Contractor shall provide a schedule of work hours for Owner's review and approval

- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
- D. Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. **Use of the building's electrical power for construction tools will not be allowed.**
- E. Nonsmoking Building: Smoking is not permitted within the building or within 50 feet of entrances, operable windows, or outdoor air intakes.
- F. Controlled Substances: Use of tobacco products and other controlled substances within the Project site is not permitted.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to Architect at earliest possible date but no later than **seven days** before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of **five** percent of Contract Sum.
 3. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

5. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
6. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Progress payments shall be submitted to Architect by the **7th day of the month**. The period covered by each Application for Payment is one month, ending on the **last day of the month**.
- D. Application for Payment Forms: Contractor shall submit, in substantial advance, for Architect's approval of the Application for Payment intended to be used, prior to the first pay request submittal.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- F. Transmittal: Submit **three** signed and notarized original copies of each Application for Payment to **Architect** by a method ensuring receipt **within 24 hours**. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Schedule of unit prices.
 5. Submittal schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 9. Initial progress report.
 10. Report of preconstruction conference.
 11. Certificates of insurance and insurance policies.
- I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.
- C. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.2 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.

1.3 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings **will not be provided** by Architect for Contractor's use in preparing submittals.
- B. All submittals, except for physical samples, actual colors, etc., **shall be made is "pdf" digital format**. The Architect will review and stamp the pdfs for distribution to the Contractor.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the

Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 7 days for review of each resubmittal.
- E. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Name of subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- F. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

4. Include the following information on an inserted cover sheet:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Name of firm or entity that prepared submittal.
 - g. Name of subcontractor.
 - h. Name of supplier.
 - i. Name of manufacturer.
 - j. Number and title of appropriate Specification Section.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - n. Other necessary identification.

- G. Options: Identify options requiring selection by the Architect.

- H. Deviations: Identify deviations from the Contract Documents on submittals.

- I. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

- J. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
 1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

- K. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

- L. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

- M. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:

1. Submit electronic submittals via email as PDF electronic files.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
2. Action Submittals: Submit three paper copies of each submittal, unless otherwise indicated. Architect will return two copies.
3. Informational Submittals: Submit two paper copies of each submittal, unless otherwise indicated. Architect will not return copies.
4. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
5. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
6. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.

- b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file.
 - b. Two paper copies of Product Data, unless otherwise indicated. Architect will return one copies.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
 - b. Two opaque (bond) copies of each submittal. Architect will return one copy.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

- a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
- a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
- a. Number of Samples: Submit four sets of Samples. Architect will retain two Sample sets; remainder will be returned.
 - 1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least four sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Submit product schedule in the following format:
 - a. PDF electronic file.
- F. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- G. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- H. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design.
1. Submit subcontract list in the following format:
 - a. PDF electronic file.

- I. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.
- J. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

2.2 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. **Mark with approval stamp before submitting to Architect.**
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

2.3 ARCHITECT'S ACTION

- A. General: **Architect will not review** submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action required by the Contractor.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. See Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.2 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.3 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.4 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to interruption to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections:
 - 1. Division 02 Section "Structure Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements.

1.2 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill acceptable to authorities having jurisdiction. Comply with CalGreen 2013.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work **is not allowed**.

PART 2 - EXECUTION

2.1 DISPOSAL OF WASTE

- A. General: Remove waste materials from Project site and **legally** dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Substantial Completion procedures.
 2. Final completion procedures.
 3. Warranties.
 4. Final cleaning.
- B. Related Sections:
1. Divisions 02 through 9 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.
1. The General Contractor shall prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete. The Architect shall develop his "Punch List" in addition to the General Contractors punch list. The General Contractor will be responsible to correction of all punch list items prior to Final Payment.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Prepare and submit Project Record Documents, final completion construction photographic documentation, and similar final record information.
 6. Terminate and remove temporary facilities from Project site, construction tools, and similar elements.
 7. Complete final cleaning requirements, including touchup painting.
 8. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection

or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order.
 2. Submit list of incomplete items in the following format:
 - a. PDF electronic file.
 - b. Three paper copies, unless otherwise indicated. Architect will return two copies.

1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds.
 2. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single PDF file document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Clean transparent materials, including glass in clerestory windows.
 - i. Remove labels that are not permanent.
 - j. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

- 1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
- k. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- l. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
- m. Leave Project clean and ready for occupancy.

END OF SECTION 017700

SECTION 055000 - METAL FABRICATIONS

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. Section Includes:
 - 1. Steel framing and supports for mechanical equipment.
- B. Products furnished, but not installed, under this Section:
 - 1. Loose steel lintels.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Powder Coat metal protection.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- C. Samples for Verification: Sample of Powder Coated metal in color selected.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages: Contractor shall be responsible for determining locations of existing framing to facilitate anchorage.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

- A. Steel Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6)**; with hex nuts, **ASTM A 563 (ASTM A 563M)**; and, where indicated, flat washers.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 325, Type 3 (ASTM A 325M, Type 3)**; with hex nuts, **ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3)**; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, **ASTM F 593 (ASTM F 738M)**; with hex nuts, **ASTM F 594 (ASTM F 836M)**; and, where indicated, flat washers; Alloy [**Group 1 (A1)**] [**Group 2 (A4)**].
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

- E. Machine Screws: **ASME B18.6.3** (ASME B18.6.7M).
- F. Lag Screws: **ASME B18.2.1** (ASME B18.2.3.8M).
- G. Wood Screws: Flat head, ASME B18.6.1.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch (1 mm)** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing[**and contour of welded surface matches that of adjacent surface**].
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
- C. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.
 - 1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.

2.7 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

2.8 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

2.9 POWDER COATED FINISHING

- A. Metal Fabricated HVAC Unit Platform Frames shall be shop fabricated in one piece. HVAC Screen structures shall be fabricated in one piece.
- B. Tiger Drylac Series 75 – Fluoropolymer
- C. Metal fabrications shall be pressure washed, sand blasted and other preparations as recommended by the powder coating supplier. Powder application and oven curing shall be per powder coating manufacturer.

END OF SECTION 055000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Framing with dimension lumber.
 - 2. Rooftop equipment platform and support blocking.
 - 3. Wood blocking and nailers.
 - 4. Wood furring.
 - 5. Wood sleepers.
 - 6. Plywood backing panels.

1.2 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Material Certificates: For dimensional lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.
- C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
 - 1. Wood-preservative-treated wood.
 - 2. Power-driven fasteners.
 - 3. Powder-actuated fasteners.
 - 4. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.

2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.

B. Maximum Moisture Content: 19 percent.

2.2 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.

B. Power-Driven Fasteners: NES NER-272.

C. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

C. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

D. Do not splice structural members between supports, unless otherwise indicated.

E. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

F. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in CBC's California Building Code.

END OF SECTION 061000

SECTION 062013 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Exterior Cement-fiber trim.
 - 2. Lumber beams and 2x decking.

1.2 SUBMITTALS

- A. Product Data: For each type exposed lumber and factory-fabricated product.
 - 1. Exterior Cement-fiber trim.
 - 2. Exterior Cement-fiber siding

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. James Hardie – Hardi-Trim Boards
- C. James Hardie – Hardi-Siding

2.2 STANDING AND RUNNING TRIM

- A. James Hardie Inc., Hardie Trim Boards – **4/4 and 5/4 “Rustic”**, factory prime painted, size per drawings.
- B. Fasteners for Exterior Finish Carpentry: Provide screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.
 - 1. Attachment of trim boards shall be made with “Finish-Head” type screws, counter-sunk per James Hardie’s recommendations. Fill countersunk screw head depressions with filler recommended by James-Hardie.
- C. Sealants: Shall be as recommended by James-Hardie for this product.

2.3 SHEET SIDING

- A. James Hardie Inc., HardiePanel-Vertical Siding "Select Cedarmill", Color: "Chestnut Brown".
 - 1. Attachments shall be as recommended by manufacturer.
- B. All Vertical siding as shown on the drawings shall be installed over Bituthene 4000 membrane self-adhering waterproofing membrane over existing wood siding.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Field prime cement-fiber trim, including both faces and edges, prior to installation. Cut to required lengths and prime ends. Comply with requirements in Division 09 Section "Exterior Painting."

3.2 INSTALLATION, GENERAL

- A. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

3.3 STANDING AND RUNNING TRIM INSTALLATION

- A. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long except where necessary.
 - 1. Miter joints, glue and screw both sides of each joint.
 - 2. Remove excess glue from faces.
 - 3. Fill countersunk screws per James Hardie's recommended filler and sand flush prior to paint. See Section 099113.

END OF SECTION 062013

SECTION 070150.19 - PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Roof tear-off.
 - 2. Partial roof tear-off.
 - 3. Roof re-cover preparation.
 - 4. Removal of base flashings.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Temporary Roofing: Should the contractor deem that Temporary Roof is required to protect the building, provide Product Data and description of temporary roofing system. The temporary roof shall not be allowed to remain.
- C. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Installer of new membrane roofing system.
- B. Reroofing Conference: Conduct conference at Project site.

1.4 PROJECT CONDITIONS

- A. The existing TPO mechanically attached single-ply membrane roof system is to be removed and replaced. Under the membrane are two layers of EPS rigid insulation that shall be removed. Under the rigid insulation is a 1/4" gypsum board sheathing that is to remain. The existing composition shingles are to remain and shall be protected from damage during the project.
- B. Owner will occupy portions of building immediately below reroofing area. Conduct re-roofing so Owner's operations will not be disrupted. Provide Owner with not less than **72** hours' notice of activities that may affect Owner's operations.
 - 1. Coordinate work activities daily with Owner so Owner can place protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area.

- C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from re-roofing operations.
- D. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building. SHOULD ROOF BE DELAYED BY WEATHER, NOTIFY THE ARCHITECT AND DOCUMENT THE TIME DELAY IN WRITING.

PART 2 - PRODUCTS

2.1 AUXILIARY REROOFING MATERIALS

- A. General: Auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of [**existing and**] new membrane roofing system.
- B. Base Sheet Fasteners: Capped head, factory-coated steel fasteners, as recommended by the roof system manufacturer and listed in FM Approval's "Approval Guide."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect existing membrane roofing system that is indicated not to be reroofed.
- B. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- C. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
- D. Verify that rooftop utilities and service piping have been shut off before beginning the Work.

3.2 ROOF TEAR-OFF

- A. General: Notify Owner each day of extent of roof tear-off proposed for that day.
- B. Roof Tear-Off: Remove existing single-ply system components and EPS rigid insulation down to the existing gypsum board sheathing.
 - 1. Remove fasteners from deck.

3.3 DECK PREPARATION

- A. Inspect existing gypsum board sheathing at the completion of the membrane and rigid insulation. Repair any damage to the gypsum board sheathing. Inspect for moisture damage to the gypsum sheathing and the 2x wood decking below. **ADVISE THE ARCHITECT OF MOISTURE DAMAGE IMMEDIATELY**, before proceeding with the new insulation install.
- B. Document and quantify any moisture (or other) damages to the wood decking. Advise the Architect of this information and await direction for replacement and/or repair of damaged deck.
- C. If broken or loose fasteners that secure deck boards to one another or to structure are observed or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.
- D. If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

3.4 TEMPORARY ROOFING MEMBRANE

- A. Install approved temporary roofing membrane over area to be reroofed as necessary to protect the roof deck and the interior of the existing building.
- B. Remove temporary roofing membrane before installing new roofing membrane.

3.5 EXISTING BASE FLASHINGS

- A. Remove existing base flashings around walls, and penetrations.
 - 1. Clean substrates of contaminants such as asphalt, sheet materials, dirt, and debris.

3.6 DISPOSAL

- A. Collect and place demolished materials in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site. Full compliance with **Calgreen's** requirement for disposal of construction materials.
- B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION 070150.19

SECTION 072100 – TAPERED THERMAL ROOF INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Tapered Poly-isocyanurate foam board insulation.
2. Flat Poly-isocyanurate foam board insulation.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product test reports.
- C. Research/evaluation reports.

PART 2 - PRODUCTS

2.1 CLOSED CELL POLYISOCYANURATE FOAM CORE W/ INORGANIC COATED GLASS FACERS

- A. Closed Cell Polyisocyanurate Board Insulation with Inorganic Coated Glass Facers: **Johns-Manville Tapered ENRGY 3 CGF. Grade 3 (25 psi) as Basis of Design.** ASTM C 1289, Type II, Class 2, Grade 3, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Johns Manville Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
 2. Type III, **25 psi (173 kPa).**

2.2 INSTALLATION OF TAPERED FOAM INSULATION

- A. Existing roof is 2x6 T&G decking with a previously installed ¼” Dens-Glass gypsum board over the wood decking that is to remain and be part of the new roof/insulation system.

- B. Insulation contractor shall be responsible for developing patterns of flat and tapered insulation panels to create a sloping top surface that will drain to either existing perimeter gutters or onto adjacent composition shingles roofs.
- C. Mechanical screw attachment of tapered foam panels **shall not penetrate** through the 2x6 wood decking. Fasteners shall be placed per manufacturer's recommendation regarding spacing of fasteners and proximity to panel edges.

END OF SECTION 072100

075423 – THERMOPLASTIC POLYOLEFIN (TPO) MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Mechanically fastened TPO membrane roofing system.
- B. Induction welded TPO membrane roofing system.
- C. Roof insulation.

1.2 RELATED SECTIONS

- A. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, cants, curbs, and blocking [and for wood-based, structural-use roof deck panels].
- B. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counter flashings.

1.3 REFERENCES

- A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms in this Section:
 - 1. ASTM D 1079 "Standard Terminology Relating to Roofing and Waterproofing."
 - 2. Glossary of NRCA's "The NRCA Roofing and Waterproofing Manual."
 - 3. Roof Consultants Institute "Glossary of Building Envelope Terms."
- B. Sheet Metal Terminology and Techniques: SMACNA "Architectural Sheet Metal Manual."

1.4 DESIGN CRITERIA

- A. General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.
- C. Installer must comply with current code requirements based on authority having jurisdiction.
- D. Wind Uplift Performance: Roofing system shall be identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7.

1. Field-of-Roof Uplift Pressure: 28 PSF
2. Perimeter Uplift Pressure: 47 PSF
3. Corner Uplift Pressure: 71 PSF

E. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets for each product to be provided.

B. Detail Drawings: Provide roofing system plans, elevations, sections, details, and details of attachment to other Work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening and adhesive patterns.

C. Verification Samples: Provide for each product specified.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Maintenance Data: Refer to Johns Manville's latest published documents on www.JM.com.

F. Guarantees: Provide manufacturer's current guarantee specimen.

G. Prior to beginning the work of this section, roofing sub-contractor shall provide a copy of the final System Assembly Letter issued by Johns Manville Roofing Systems indicating that the products and system to be installed shall be eligible to receive the specified manufacturer's guarantee when installed by a certified JM contractor in accordance with our application requirements, inspected and approved by a JM Technical Representative.

H. Prior to roofing system installation, roofing sub-contractor shall provide a copy of the Guarantee Application Confirmation document issued by Johns Manville Roofing Systems indicating that the project has been reviewed for eligibility to receive the specified guarantee and registered.

1. "**NORTHSTAR**" must be listed as the Specifier/Consultant of record in the appropriate fields on the Guarantee Application Confirmation.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive the specified manufacturer's guarantee.
- B. Manufacturer Qualifications: Qualified manufacturer that has UL listing for roofing system identical to that used for this Project.
- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 329.
- D. Source Limitations: Obtain all components from the single source roofing manufacturer guaranteeing the roofing system. All products used in the system must be labeled by the single source roofing manufacturer issuing the guarantee.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.9 GUARANTEE

- A. Provide manufacturer's system guarantee equal to [Johns Manville's Peak Advantage No Dollar Limit Roofing System Guarantee](#).
 - 1. Single-Source special guarantee includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, walkway products, manufacturer's edge metal products, and other single-source components of roofing system marketed by the manufacturer.
 - 2. Guarantee Period: **10** years from date of Substantial Completion.
 - 3. Contractor is required to list "**NORTHSTAR**" as the Specifier/Consultant of record in the appropriate fields ("Specifier Account") when applying for the manufacturer's warranty.

- B. Installer's Guarantee: Submit roofing Installer's guarantee, including all components of roofing system for the following guarantee period:
1. Guarantee Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE – TPO (MECHANICALLY ATTACHED)

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced. Basis of Design: [JM TPO](#)
1. Membrane Thickness: **60 mils (1.52 mm), nominal**
 2. Exposed Face Color: **White**
 - a. Exposed Face Color: White
 - b. Serviceable Installation Temperature: 20°F (-7°C) and above.

2.2 AUXILIARY ROOFING MATERIALS – SINGLE PLY

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's internally reinforced or scrim reinforced, smooth backed membrane with same thickness and color as sheet membrane. Basis of Design: [JM TPO](#)
- C. Sheet Flashing (Self-Adhered): 60 mil (1.5 mm) thick, manufacturer's internally reinforced or scrim reinforced with weldable selvage edges on each side of roll, one encapsulated edge and self-adhering capabilities in a wide installation temperature range. Basis of Design: [JM TPO SA – Flashing Membrane](#)
1. Serviceable Installation Temperature: 20°F (-7°C) and above.
- D. Bonding Adhesive: Manufacturer's standard and [solvent] [water]-based bonding adhesive for base flashings. Basis of Design: [JM Membrane Bonding Adhesive (TPO&EPDM)]
- E. Self-Adhered Primer: One-part penetrating primer solution to enhance the adhesion of self-adhering membranes. [SA Primer Low VOC](#)
- F. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, with anchors. Basis of Design: [JM Termination Systems](#)
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer. Basis of Design: [High Load Fasteners and Plates](#)

- H. Induction Welding Plate: A round specially coated Galvalume® plate with a recessed center and raised flat bonding surface specifically designed for induction welding application. Basis of Design: JM TPO RhinoPlates
- I. Miscellaneous Accessories: Provide pourable sealers, primers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, cover strips, and other accessories required for full installation. Basis of Design: JM TPO Pourable Sealer A & B, JM TPO Pipe Boots, JM TPO Universal Corners, JM TPO Edge Sealant, JM TPO T-Joint Patch, JM TPO Membrane Cleaner, JM TPO Membrane Primer, JM TPO Membrane Primer (Low VOC), JM TPO Sealing Mastic, JM TPO Cover Tape, JM TPO Detail Membrane, JM TPO Peel & Stick 10" RPS, JM TPO Peel & Stick 6" RTS, JM TPO-Coated Metal, JM TPO Curb Flashing and JM Single Ply Caulk

2.3 AUXILIARY ROOFING SYSTEM COMPONENTS

- A. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."

2.4 WALKWAYS AND SAFETY STRIPS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads sourced from membrane roofing system manufacturer. Basis of Design: JM TPO Walkpad
- B. Safety Strips: Manufacturer's minimum 65 mils total thickness, comprise of 30 mil yellow non-reinforced TPO membrane laminated to 35 mil white cured seaming tape. Basis of Design: JM Single Ply Safety Strip
 - 1. Exposed Face Color: Yellow

2.5 COVER BOARD

- A. Existing Gypsum Board: ¼" Dens-glass gypsum sheathing is currently under the existing TPO roof membrane and 2 layers of EPS insulation. The existing membrane and EPS insulation is to be removed and replaced.

2.6 ROOF INSULATION

- A. General: Preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1 Grade 3 (25 psi), Basis of Design: ENRGY 3 25 PSI (Flat and Tapered)
 - 1. Provide insulation package with minimum R Value: [insert R Value] [minimum required by applicable code].
 - 2. Provide insulation package with minimum thickness: [insert thickness].
 - 3. Provide insulation package in multiple layers.
 - 4. Minimum Long-Term Thermal Resistance (LTTR): 5.7 per inch.

- a. Determined in accordance with CAN/ULC S770 at 75°F (24°C)

2.7 TAPERED INSULATION

- A. Tapered Insulation: ASTM C 1289, Type II, Class 1 Grade 3 (25 psi), provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated. Basis of Design: Tapered ENERGY 3 25 PSI

2.8 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Provide factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated. Basis of Design: Diamondback Pre-Cut Cricket
- C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer. Basis of Design: UltraFast Fasteners and Plates
- D. Urethane Adhesive: Manufacturer's two component polyurethane adhesive formulated to adhere insulation to substrate. Basis of Design: JM Two-Part Urethane Insulation Adhesive (UIA)
- E. Wood Nailer Strips: Comply with requirements in Division 06 Section "Miscellaneous Rough Carpentry."

2.9 SUBSTRATE BOARD

- A. Class A Substrate Board: 1/4" Dens-glass gypsum sheathing is currently under the existing TPO roof membrane and 2 layers of EPS insulation. The existing membrane and EPS insulation is to be removed and replaced.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for compliance with the requirements affecting performance of roofing system.
 1. General:
 - a. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.

- b. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- 2. Wood Decks:
 - a. Verify that wood decking is visibly dry and free of moisture according to manufacturer's approved method.
 - b. Verify that wood has ability to provide minimum fastener pull-out resistance.
 - 1) Provide documentation of pull out resistance values using manufacturer's approved procedures.
- 3. Ensure general rigidity and proper slope for drainage.
- 4. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units more than 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
- B. Unacceptable panels should be brought to the attention of the General Contractor and Project Owner's Representative and must be corrected prior to installation of roofing system.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and remove from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.
- C. If applicable, prime surface of deck with asphalt primer at a rate recommended by roofing manufacturer and allow primer to dry.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 RE-ROOF PREPARATION

- A. Remove all roofing membrane, surfacing, coverboards, insulation, fasteners, asphalt, pitch, adhesives, etc.
 - 1. **Remove an area no larger than can be re-roofed in one day.**
- B. Tear out all base flashings, counterflashings, pitch pans, pipe flashings, vents and like components necessary for application of new membrane. Extend Plumbing vents, flues, etc. for new insulation thickness.
- C. HVAC units are to removed and relocated and installed on raised platforms to facilitate roof drainage. and other equipment supported by curbs to conform with the following:

- D. Immediately remove all debris from roof surface. Demolished roof system may not be stored on the roof surface.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 INSULATION INSTALLATION

- A. Coordinate installation of roof system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch with like material.
- E. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- F. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- H. Preliminarily Fastened Insulation for Mechanically Fastened Membrane Systems: Install insulation with fasteners at rate required by roofing system manufacturer or applicable authority, whichever is more stringent.
 - 1. Fasten top layer to resist uplift pressure at corners, perimeter, and field of roof.
- I. Proceed with installation only after unsatisfactory conditions have been corrected.

3.5 ROOFING MEMBRANE INSTALLATION, GENERAL

- A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.
- B. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.
- C. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.

2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.6 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing in accordance with roofing system manufacturer's written instructions.
1. Unroll roofing membrane and allow it to relax before installing.
 2. Install sheet in accordance with roofing system manufacturer's written instructions.
- B. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- D. Always install membrane laps perpendicular to the steel deck flutes. "Picture Frame" installation method is not permitted.
- E. Apply roofing membrane with side laps shingled with roof slope, where possible.
- F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 - a. Remove and repair any unsatisfactory sections before proceeding with Work.
 3. Repair tears, voids, and lapped seams in roofing membrane that do not meet requirements.
- G. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- H. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.
- I. Install roofing membrane and auxiliary materials to tie in to existing roofing.
- J. Proceed with installation only after unsatisfactory conditions have been corrected.

3.7 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates per membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Apply water-based bonding adhesive in two sided application, at required rate, and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- D. Self-Adhere membrane to smooth approved substrates, when substrate temperatures are 40°F (4.5°C) and rising.
 - 1. The use of SA Primer or SA LVOC Primer is required for flashing applications on curbs and parapet walls for temperatures between 40°F (4.5°C) and 20°F (-7°C).
 - 2. The use of SA Primer or SA LVOC Primer is required for flashing applications over approved substrates with a porous or rough surface, including: Dens Deck Prime, Dens Deck, DEXcell, concrete and smooth faces CMU.
- E. Flash penetrations and field-formed inside and outside corners per manufacturer's installation instructions.
- F. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- G. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
- H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.8 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld and adhere walkway products to substrate according to roofing system manufacturer's written instructions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's Registered Roof Observer (RRO) to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 PROTECTION AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formed roof drainage sheet metal fabrications.
2. Formed steep-slope roof sheet metal fabrications.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop and field-assembled work.

1. Include details for forming, joining, supporting, and securing sheet metal flashing and trim, including pattern of seams, termination points, fixed points, expansion joints, expansion-joint covers, edge conditions, special conditions, and connections to adjoining work.

C. Samples: For each exposed product and for each finish specified.

D. Maintenance data.

E. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.4 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
1. TPO coated Galvanized Sheet Metal shop fabricated flashings and counterflashings that interface with the TPO Membrane roof system.
 2. Zinc-Coated (Galvanized), **Paint-Grip** (Bonderized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality.
 3. Color: Exposed Sheet Metal Flashing shall be painted as specified, color as selected by the Architect.

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 2. Fasteners for Paint Grip Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Solder:
1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Sealed Joints: Form non expansion but movable joints in metal to accommodate elastomeric sealant.
- C. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- E. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Pop Rivet joints where necessary for strength.
- G. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Pop Rivet joints where necessary for strength.
- H. Base Flashing: Fabricate from the following materials:
 - 1. Galvanized Steel: 24 ga.
- I. Counterflashing: Fabricate from the following materials:
 - 1. Galvanized Steel: 24 ga.

- J. Roof-Penetration Flashing: Fabricate from the following materials:
1. Galvanized Steel: 24 ga.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement so that completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 5. Install sealant tape where indicated.
 6. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
1. Coat back side of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with **no joints allowed within 24 inches of corner** or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently

watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch) for wood screws.
- E. Seal joints as shown and as required for watertight construction.
- F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.
 - 1. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.4 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.5 PAINTING: Paint of exposed galvanized sheet metal shall be per Section 099113. Painting of exposed TPO sheet metal shall be painted with a paint system that is compatible with TPO coating.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 076200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Silicone joint sealants.
 2. Urethane joint sealants.
 3. Preformed joint sealants.

1.2 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
 2. Joint-sealant manufacturer and product name.
 3. Joint-sealant formulation.
 4. Joint-sealant color.

1.3 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.4 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
 - 1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- C. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

2.2 SILICONE JOINT SEALANTS

- A. Silicone Joint Sealant: ASTM C 920.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. BASF Building Systems.
 - b. Dow Corning Corporation.
 - c. GE Advanced Materials - Silicones.

2.3 URETHANE JOINT SEALANTS

- A. Urethane Joint Sealant: ASTM C 920.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. BASF Building Systems.
 - b. Bostik, Inc.

2.4 JOINT SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
 - 1. Remove laitance and form-release agents from concrete.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

- B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
- F. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 079200

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Exterior water-resistant Type "X" gypsum board.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. National Gypsum Company.
 - b. PABCO Gypsum.
 - c. USG Corporation.
- B. Exterior Fire-Rated, Type "X" Moisture and Mold Resistant Type:
 - 1. Thickness: 5/8"
 - 2. Long Edges: Tapered.

2.2 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized steel sheet, rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.

- b. LC-Bead: J-shaped; exposed long flange receives joint compound.

2.3 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 1. Exterior Gypsum Wallboard: Fiberglass.
- C. Joint Compound for Exterior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints beveled panel edges, and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use sandable topping compound.
 4. Finish Coat: For third coat, use all-purpose compound.

2.4 FINISHES

- A. Primer (Paint): As recommended by textured finish manufacturer.
- B. Smooth Finish to match existing. (Level 4)

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage. **ALL GYPSUM BOARD ATTACHMENT SHALL BE WITH SCREW.**

3.2 APPLYING EXTERIOR GYPSUM PANELS AT EXHAUST FAN RAISING.

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
 - 1. Install per fire-rated tested assembly.
 - 2. Fasten with corrosion-resistant screws.

3.3 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. LC-Bead: Refer to Drawings.

3.4 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to match existing ceiling surface.
- E. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- F. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or blotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:
1. Existing Wood Trim and Siding.
 2. New Hardi-Vertical Siding and Trim boards
 3. TPO Coated Metal Flashings
 4. Galvanized metal.
 5. Steel.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each finish and for each color and texture required.
- C. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
- D. MSDS Sheets shall be available at the project site.

1.3 QUALITY ASSURANCE

- A. MPI (Master Painter Institute) Standards:
1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
 3. All paint products shall comply with "**Cal-Green 2013**" Content Limits for Architectural Coatings.
- B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

- a. Vertical and Horizontal Surfaces: Provide samples of at least 10 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.4 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 1. Quantity: Furnish an additional 2 gallons of each material and color applied.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

- A. Material Compatibility:
 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Colors: As selected by Architect from manufacturer's full range.

2.2 PRIMERS/SEALERS

- A. Alkali-Resistant Primer: MPI #3.
 1. VOC Content: per Calgreen
- B. Bonding Primer (Water Based): MPI #17.
 1. VOC Content: per Calgreen
- C. Bonding Primer (Solvent Based): MPI #69.
 1. VOC Content: per Calgreen

- 2.3 METAL PRIMERS - Basis of Design: S/W Extreme Bond Primer B51W00150 Acrylic Metal Primer, VOC Content per Calgreen
- A. Alkyd Anticorrosive Metal Primer: MPI #79.
 - 1. VOC Content: per Calgreen
 - B. Quick-Drying Alkyd Metal Primer: MPI #76.
 - 1. VOC Content: per Calgreen
 - C. Cementitious, Galvanized-Metal Primer: "Loxon" Primer MPI #26.
 - 1. VOC Content: per Calgreen
- 2.4 WOOD PRIMERS – As recommended by Finish Coat manufacturer. Basis of Design: Comex C312 UltraTech 100% Acrylic Wood Primer, VOC Content per Calgreen
- 2.5 EXTERIOR LATEX PAINTS (WOOD) - Basis of Design: Sherwin Williams "Emerald" Exterior Acrylic Satin K48 Series, VOC Content per Calgreen
- 2.6 CEMENT FIBER VERTICAL SIDING AND TRIM - Basis of Design: Sherwin Williams, "A-100 Exterior Latex Satin, A82 Series, VOC Content per Calgreen
- 2.6 EXTERIOR METAL LATEX PAINTS (METAL) - Basis of Design: Sherwin Williams "Duration" Exterior Acrylic Satin K33-200 Series, VOC Content per Calgreen

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Plaster: 12 percent.
 - 5. Gypsum Board: 12 percent.

- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Protect work of other trades or existing conditions to remain, against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 EXTERIOR PAINTING SCHEDULE

- A. Galvanized-Metal Substrates:
 - 1. Latex System: See above
 - a. Prime Coat: Cementitious galvanized-metal primer.
 - b. Intermediate Coat: Exterior latex matching topcoat.
 - c. Topcoat: Exterior latex – Satin finish.
- B. Wood Beams, Roof Deck, Wood Framing and Wood Trim:
 - 1. Latex System: See above. Color as selected.
 - 2. New wood shall be primed and back primed prior to installation of the wood. Prime this wood after installation and apply 2 coats of Finish.
 - 3. Existing wood surfaces to be painted shall be scraped, filled and sanded as necessary prior to applying 1 coat of primer and 1 coat of Finish.
- C. Cement-Fiber Wood Trim and Siding Substrates:

1. Latex System: See Part 2 above.
 - a. Prime and Back-prime Coat: Exterior latex matching topcoat.
 - b. Intermediate Coat: Exterior latex matching topcoat.
 - c. Topcoat: Exterior latex **semi gloss, field verify sheen of existing paint finish.**

SECTION 220000 – PLUMBING**PART 1 – GENERAL****1.1 INCLUDED**

- A. This Specification establishes the required standards for all labor, materials, equipment, and workmanship in connection with the furnishing, fabrication, and installation of “Plumbing.” Plumbing work includes, but is not limited to, the following items of work:
1. A complete system of soil, waste, vent, and sanitary sewer piping and structures, including provisions for mechanical equipment drainage; and connection of same to public sanitary sewers, located as indicated on the Drawings.
 2. Cold water distribution system, complete, from points of contact with site domestic water systems (located approximately as indicated on the Drawings) to all plumbing fixtures, mechanical equipment, building specialties, and Owner supplied equipment scheduled for service on the Drawings.
 3. Hot water distribution system, complete, from serving water heaters and/or points of contact with site domestic hot water, to all plumbing fixtures, mechanical equipment, building specialties, and Owner supplied equipment schedule for service on the Drawings.
 4. All plumbing fixtures and trim as scheduled on the Drawings, inclusive of setting of Fixtures and connections to drainage and water supply systems.
 5. Flashing of all plumbing pipe penetrations through exterior walls, roofs, and foundations. Sheet metal and lead flashings for pipe penetrations through roofs shall be furnished by the Plumbing Contractor and installed by the appropriate Roofing Contractor.
 6. Excavation and backfill as required for the work of this Section in conformity with Earthwork Section of the Specifications.
 7. Rough in and connection of all fixtures and equipment furnished by the Owner and/or Tenant.
 8. Final connection of water and natural gas to equipment furnished under other Sections.
 9. Protection of all piping specified herein and/or shown on the Drawings, from freezing. Buried piping shall be a minimum 12” below the local front line. Piping above grade in unconditioned areas shall be insulated.
 10. Testing and adjusting of all piping systems and equipment herein specified.
 11. Sterilization of domestic water systems.
 12. Pipe wrapping and insulation.
- B. The bidding requirements and contract forms, including General Conditions and Supplemental General Conditions, all Division 01 Sections apply to all work herein.
- C. Should any work or material not be included in the Drawings or Specifications but it nevertheless necessary for the proper execution of the stated scope therefore for full compliance with codes, laws, rules, and regulations, the Contractor shall understand such work and material is required, and shall perform all such work.

SECTION 230000 - HVAC**PART 1 – GENERAL****1.1 INCLUDED**

- A. This section covers mechanical work, complete. Work includes furnishing, installing, calibrating, adjusting, testing, documenting, and starting up equipment in accordance with these Specifications, the accompanying Plans, and the directions of the Engineer.

1.2 LICENSES, PERMITS, AND FEES

- A. The Contractor shall provide, procure, and pay for all licenses, permits, fees, etc. as required to carry on and complete their work.

1.3 CODES AND STANDARDS

- A. All work shall be done in code with all applicable local, state, and federal building safety codes, ordinances, and regulations. Additionally, all work shall conform to the latest editions of the following standards:
 - 1. National Fire Protection Association.
 - 2. California Mechanical Code.
 - 3. California Plumbing Code.
 - 4. Underwriters Laboratories.
 - 5. Titles 8, 17, 19, 21, 24 of the California Code of Regulations.
 - 6. California Electric Code.
 - 7. SMACNA Standards.
 - 8. ASHRAE Standards 55 and 62.1.
- B. When the Contract Documents call for materials or construction of a higher standard than is required by the above, the Contract Document requirements shall take precedence over the requirements of the applicable laws, ordinances, rules, or regulations. Nothing in the Contract Documents shall be interpreted as permitting work in violation of said laws, rules, and/or regulations.
- C. The Contractor for this work shall furnish, without extra charge, any additional materials and/or labor as may be required for compliance with these laws, rules, and/or regulations though such materials and/or labor are not specially set forth in the Contract Documents.

1.4 LICENSING REQUIREMENTS

- A. All work of Division 22 and 23 shall be performed by an appropriately licensed contractor. The licenses shall be current, valid through the term of the contract and in the name of the contractor.
 - 1. All HVAC work, which includes warm air heating systems and water heating pumps, ventilating systems, air conditioning systems, and ductwork, registers, flues, humidity,

SECTION 230593 – TESTING ADJUSTING BALANCING

PART 1 GENERAL

1.1 SCOPE

- A. Provide all supervision, personnel, instruments, calibration, equipment, and all other materials necessary to perform balancing and testing, and compile test data including calculations and services necessary for the heating, ventilating, and air conditioning systems for this project, all in accordance with the project Drawings and Specifications and as specified herein.

1.2 GENERAL

- A. Mechanical Contractor will employ a Testing, Adjusting, and Balancing (TAB) Agency that is certified by Associated Air Balancing Council (AABC), National Environmental Balancing Bureau (NEBB), or Testing, Adjusting, and Balancing Bureau (TABB).
- B. The TAB Agency shall be responsible for inspecting, balancing, adjusting, testing, and logging the data of the performance of fans, all dampers in the duct systems, all air distribution devices, and the flows of water through all coils.
- C. Existing equipment, unless specifically mentioned otherwise, shall not in the scope of the TAB work.
- D. A completely operable system shall be placed into operation each day during testing and balancing.
- E. The TAB Agency shall utilize instrumentation which meets the requirements of ASHRAE 111, Section 5, "Instrumentation".
- F. The Mechanical Contractor shall be responsible for certifying in writing that the system, as scheduled for balancing, is operational and complete. Completeness shall include not only the physical installation, but the Mechanical Contractor's certification that the prime movers are installed in good working order, and that full load performance has been preliminary tested under the certification of the Mechanical Contractor. Before any testing and balancing is started, a complete report shall be sent to the TAB Agency by the Mechanical Contractor.
- G. The Mechanical Contractor shall be responsible for making all modifications to recertify discrepancies reported by the TAB Contractor as indicating non-compliance with the Contract Documents. By completing the work on time, the Mechanical Contractor shall provide sufficient time before the completion date so that balancing can be accomplished.
- H. If construction deficiencies are encountered which preclude obtaining optimum conditions, the deficiencies will be recorded and given to the Owner's representative. The TAB Agency is advised that deficiencies in the HVAC construction are often encountered during final TAB services, and should include in the bid an amount deemed advisable to compensate for time in identifying the deficiencies.

SECTION 260000 – ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL

- A. Electrical plan drawings show only general locations of equipment, devices, and raceway unless specifically dimensioned. The Contractor is responsible for the proper routing of raceway, subject to the approval of the Engineer. Make adjustments as necessary to wiring, conduit, disconnects, branch circuit protection, and other affected material or equipment to accommodate actual equipment supplied for this project.

1.2 CODES, PERMITS, AND REGULATIONS

- A. Do all work and install all materials and equipment in accordance with the requirements of the California Electrical Code (CEC), applicable state and local laws and ordinances, and the power company. Conflicts, if any, will be resolved at the discretion of the Engineer.

1.3 COORDINATION

- A. Close coordination between the electrical and mechanical trades is a part of the work that is required by this contract. No allowance will be made for omissions based on incorrectly assuming another trade will be performing your work.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Unless otherwise indicated, provide all first-quality new materials, free from any defects, and suitable for the intended use and the space provided. Provide materials approved by UL wherever standards have items not specifically shown or specified which are required to provide the complete systems specified herein. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.

2.2 EQUIPMENT FINISH

- A. Unless otherwise indicated, finish for electrical equipment and enclosures shall be manufacturer's standard gray or ANSI 61 gray over a primer and rust inhibitor.

2.3 JUNCTION AND PULLBOXES

- A. Large Weatherproof: NEMA 3r.
 - 1. Box: Galvanized Steel.
 - 2. Cover: Screw with provisions for pad locking.
 - 3. Embossed mounting holes on back of enclosure.

4. No gasketing.

2.4 CONDUIT AND TUBING

- A. Electric Metallic Tubing (EMT):
 1. Meet requirements of ANSI C80.3 and UL 797.
 2. Material: Hot-dip Galvanized, with Chromated and Lacquered Protective Layer.
- B. Flexible metal, liquid-tight conduit:
 1. UL 360 listed for 105°C insulated conductors.
 2. Material: Galvanized Steel, with an Extruded PVC Jacket.

2.5 FITTINGS

- A. Electric metallic tubing:
 1. Meet requirements of UL 514b.
 2. Type: Steel body and lock nuts with steel or malleable iron compression nuts.
- B. Flexible Metal, liquid-tight conduit: Insulated throat and sealing O-rings.

2.6 CONDUCTORS

- A. All conductors shown shall be new unless otherwise indicated.
- B. Conductor type: Stranded Copper.
- C. Insulation: Type THHN/THWN, 90°C Dry or 75°C Wet.

2.7 CONDUCTOR ACCESSORIES

- A. Tape:
 1. General purpose, flame retardant: 7 mil, vinyl plastic, rated for 90°C minimum meeting requirements of UL 510.
 2. Flame retardant, cold and weather resistant: 8.5 mil, vinyl plastic.
- B. Cable ties:
 1. Nylon, adjustable, and self-locking.

2.8 DISCONNECT SWITCH, INDIVIDUAL, 0 TO 600 VOLTS:

- A. NEMA KS 1.
- B. Quick-make, quick-break, motor rated, load-break, heavy-duty (HD) type with external markings clearly indicating on/off positions.
- C. Enclosure: NEMA 12, industrial use, NEMA 3R, denoted by WP, unless otherwise shown.

- D. Interlock: Enclosure and switch to prevent opening cover with switch in the on position.
- E. Lockable to the open position. Provide tag reading "Do not open under load."

PART 3 – EXECUTION

3.1 GENERAL PROCEDURES

- A. Coordinate electrical work with the owner and work of other trades to avoid conflicts, errors, delays, and unnecessary interference during construction.

3.2 PROTECTION DURING CONSTRUCTION

- A. Following installation, protect materials, equipment, and insulation from corrosion, physical damage, and moisture. Cap conduit runs during construction with manufactured seals. Keep openings in boxes or equipment closed during construction.

3.3 MATERIAL AND EQUIPMENT INSTALLATION

- A. Follow the manufacturer's installation recommendations unless otherwise indicated. Follow the Engineer's decision, wherever any conflict arises. Keep copy of the manufacturer's installation instructions available on the jobsite for review at all times.

3.4 CUTTING AND PATCHING

- A. Do not cut or notch any structural member or building surface without specific approval of the Engineer. Following such work, restore surfaces neatly to new condition using skilled craftsmen of the trades involved.

3.5 CLEANING AND TOUCH-UP PAINTING

- A. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps, and debris from the premises and from the interior and exterior of all devices and equipment. Refinish damaged surfaces to new condition using skilled craftsmen of the trades involved.

3.6 RACEWAY SYSTEM

- A. Unless otherwise specified or indicated, wiring shall consist of insulated conductors installed in raceways of the types indicated.
- B. Exterior, Exposed: Electric Metallic Tubing.
- C. For equipment where flexible connection is required to minimize vibration:
 - 1. Flexible metal, Liquid-Tight Conduit.
 - 2. Length: 18-inch minimum, 60-inch maximum of sufficient length to allow movement or adjustment of equipment.

- D. Box Type (All Raceway Systems)
 - 1. Exterior locations: Weatherproof Type 3R.
- E. Install pull boxes where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs. Install pull boxes where necessary in raceway system to facilitate conductor installation. Install pull boxes in conduit runs at least every 150 feet or after the equivalent of three right-angle bends. Use outlet boxes as junction and pull boxes wherever possible and allowed by applicable codes. Install pull boxes in underground conduit runs with large changes in elevation to relieve hydraulic pressure in conduit.
- F. Support boxes independently of conduit by attachment to building structure or structural member. Install bar hangers in frame construction, or fasten boxes directly with wood screws on wood, bolts and expansion shields on concrete or brick, toggle bolts on hollow masonry units, and machine screws or welded threaded studs on steelwork.

3.7 RACEWAY INSTALLATION

- A. Conduit and tubing sizes shown are based on the use of copper conductors.
- B. Maintain raceway entirely free of obstructions and moisture.
- C. Group raceways installed in same area.
- D. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.
- E. All metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.

3.8 RACEWAY PENETRATIONS

- A. Make at right angles, unless otherwise shown.
- B. Notching or penetration of structural members, including footing and beams, not permitted.
- C. Fire-rated walls, floors, or ceilings: Fire-Stop openings around penetrations to maintain fire-resistance rating.

3.9 RACEWAY SUPPORT

- A. Support from structural members only, at intervals not exceeding CEC requirements, and in any case not exceeding 10 feet. Do not support from piping, pipe supports, or other raceways.
- B. Wall brackets and associated hardware in contact with concrete or Masonry shall be stainless steel. Provide Galvanized Steel at all other locations. Strap hangers, and ceiling trapeze including hardware, shall be Galvanized Steel.

- C. Nails or wooden plugs inserted in concrete or Masonry for attaching raceway not permitted. Do not weld raceways or pipe straps to steel structures. Do not use wire in lieu of straps or hangers.

3.10 RACEWAY BENDS

- A. Install concealed raceways with a minimum of bends in the shortest practical distance.
- B. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.
- C. Flexible conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

3.11 TERMINATION AT ENCLOSURES

- A. Sheet Metal Boxes, Cabinets, And Enclosures:
 - 1. Electric Metallic Tubing: Provide gland compression, insulated connectors.
 - 2. Flexible Metal Conduit: Provide two screw type, insulated, malleable iron connectors.

3.12 CONDUCTORS

- A. Connections and Terminations:
 - 1. Install wire nuts only on solid conductors.
 - 2. Install nylon self-insulated crimp connectors and terminators for circuit conductors no. 6 AWG and smaller.
- B. Do not use soldered mechanical joints.
- C. Splices and Terminations:
 - 1. Indoors: Use general purpose, flame retardant tape.
 - 2. Outdoors: Use flame retardant, cold- and weather-resistant tape.
- D. Cabinets and Panels:
 - 1. Remove surplus wire, bridle and secure.
 - 2. Where conductors pass through openings or over edges in sheet metal, remove burrs chamfer edges, and install bushings and protective strips of insulating material to protect the conductors.

3.13 GROUNDING

- A. Unless otherwise indicated, ground all exposed noncurrent-carrying metallic parts of electrical equipment, raceway systems, and the neutral of all wiring systems in accordance with the CEC, state, and other applicable laws and regulations.

END OF SECTION 260000

1.3 SERVICES

- A. The TAB Agency will balance, test, and adjust the systemic components to obtain optimum conditions in each conditioned space in the building. If construction deficiencies are encountered which preclude obtaining optimum conditions, the deficiencies will be recorded and given to the Owner's representative. The TAB Agency is advised that deficiencies in the HVAC construction are often encountered during final TAB services, and should include in the bid an amount deemed advisable to compensate for time in identifying the deficiencies.
- B. The report shall be complete with logs, data, and records as required herein and all logs, data, and records shall be typed, produced, on white bond paper, and bound. Transmit four copies directly to the Owner's Representative to be distributed to the Mechanical Contractor, Controls Contractor, Engineer, and record file.
- C. The report shall contain the following general data in a format selected by the TAB Agency for clarity and ease of reference.
 - 1. Project Title.
 - 2. Project Location.
 - 3. Project Architect (Firm name and address).
 - 4. Project Mechanical Engineer (Name).
 - 5. TAB Field Test Engineer (Name).
 - 6. TAB Agency (Firm name and address).
 - 7. Inclusive dates tests were performed and date of report.
 - 8. Calibration Certificates of each instrument used along with specific ID numbers (i.e., serial numbers).

1.4 SUBMITTALS

- A. Submittal No. 15950 (1) – TAB Agenda
 - 1. The TAB Contractor shall submit a complete agenda, which shall outline in full the testing methods and locations for each HVAC system and/or device that is within the scope of the TAB work. The agenda shall represent the total system balance report, less field test data. Areas of intended field test inputs shall be represented by fully labeled blank spaces.
 - 2. The TAB Agenda shall also indicate the proposed test methods, instrumentation devices and all applicable calibration certificates.
- B. Submittal No 15950 (2) – TAB Report
 - 1. Provide Test and Balance Report as indicated herein.

1.5 AIR SYSTEMS REQUIREMENTS

- A. In addition to the above data in its appropriate format, the Test and Balance Report shall include the following data:
 - 1. Packaged Rooftop Units and Furnaces

- a. Manufacturer and model.
- b. Size.
- c. Motor hp, voltage, phase, cycles, full load amps.
- d. Location and local identification data.
- e. Identification tag listed in schedules on drawings and specifications.
- f. Supply airflow (cfm) and exhaust airflow (cfm), where applicable.
- g. Fan RPM.
- h. Motor current readings at each fan.
- i. Inlet and outlet static pressure from supply fan and exhaust fan (if applicable). These readings shall be related to the fan curve.
- j. Static pressure differential across each coil and filter section.
- k. Entering air and leaving air temperatures (DB/WB) in 100% cooling mode.
- l. Entering air and leaving air temperatures (DB) in 100% heating mode.
- m. Outdoor air percentage setting.
- n. Outdoor airflow in economizer mode (if applicable).
- o. Outdoor airflow in demand control ventilation mode (if applicable).

2. Roof Exhaust Fans

- a. Manufacturer and model.
- b. Size.
- c. Motor hp, voltage, phase, cycles, full load amps.
- d. Location and local identification data.
- e. Identification tag listed in schedules on drawings and specifications.
- f. Exhaust airflow (cfm).
- g. Fan RPM.
- h. Motor current readings at each fan.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION

3.1 GENERAL PROCEDURES

- A. During the balancing, the temperature regulation shall be adjusted for proper relationship between controlling instruments and calibrated. The correctness of the final setting shall be proved by taking hourly readings for a period of one successive 8-hour day, in a typical room on each separately controlled zone, after tenant moves in. The total variation shall not exceed 2 degrees from the preset medium temperature during the temperature survey period. (This will be done only on systems that are totally operational).

3.2 AIR SYSTEMS PROCEDURES

- A. The TAB Agency shall perform the following tests and balance the air systems in accordance with the following requirements:

1. Test and adjust blower and motor rpm to design requirements.
2. Test and record motor full load amperes and corresponding voltage.
3. Make pitot tube traverse of main supply ducts and obtain design cfm at fans.
4. Test and record system static pressures, suction and discharge.
5. Test and adjust system for design cfm of outside air.
6. Test and record entering and leaving air dry bulb temperatures of all heating and cooling coils.
7. Test and record entering and leaving wet bulb temperatures of all cooling coils.
8. Adjust all main supply and return air ducts to proper design cfm. System supply airflow, system return airflow, and system outdoor airflow shall be balanced to within 5% of the design requirement.
9. Adjust all zones to proper design cfm, supply and return.
10. Test and adjust each diffuser, grille, and register to within 10% of design requirement.
11. Each grille, diffuser, and register shall be identified as to location and area.
12. Size, type, and manufacturer of diffusers, grilles, registers, and all tested equipment shall be identified and listed. Manufacturer's ratings on all equipment shall be used to make required calculations.
13. Readings and test of diffusers, grilles, and registers shall include required fpm velocity and test resultant velocity, required cfm and test resultant cfm after adjustments.
14. TAB Agency shall check all controls to ensure they are operating as specified. Provide the control contractor with specific set points.

3.3 TEMPERATURE CONTROL SYSTEM

A. In the progress of performing the TAB work, the TAB Agency shall:

1. Work with the Controls Contractor to ensure the most effective total system operation within the design limitations, and to obtain mutual understanding of intended control performance.
2. Verify that all control devices are properly connected.
3. Verify that all dampers, valves, and other controlled devices are operated by the intended controller.
4. Verify that all dampers and valves are in the position indicated by the controller (open, closed, or modulating).
5. Verify that the integrity of valves and dampers in terms of tightness of close-off and full-open position. This includes dampers in multi-zone units.
6. Check that all valves are properly installed in the piping system in relation to direction of flow and location.
7. Verify the calibration of all controllers.
8. Verify the proper application of all normally open and normally closed valves.
9. Check the locations of all thermostats and humidistats for potential erratic operation from outside influences such as sunlight, drafts, or cold walls.
10. Check the locations of all sensors to determine whether their position will allow them to sense only the intended temperatures or pressures of the media. Controls Contractor will relocate as deemed necessary by the TAB Agency.
11. Check the sequence of operation for any control mode is in accordance with approved shop drawings. Verify that only minimum simultaneous heating and cooling occurs. Observe that heating cannot take place until the cooling zone of valve is completely closed.
12. Verify that all controller set points meet the design intent.

13. Check all dampers for free travel.
14. Verify the operation of all interlock systems.
15. Perform all system verification to assure the safety of the system and its components.

B. A systematic check of the above requirements shall be included in the final TAB report.

3.4 DUCT LEAKAGE TEST

A. All ductwork shall be tested for leaks, using necessary instruments before insulating any ductwork. Conduct test as follows and as recommended in SMACNA Balancing Manual.

1. Seal all openings in duct section and plenum to be tested.
2. Connect test apparatus to test section of cuts, using a flexible duct connection or hose (fitting provided by Mechanical Contractor).
3. Close damper on blower suction side to prevent excessive build-up of pressure.
4. Start blower and gradually open damper on suction side of blower.
5. Determine amount of air leakage and make repairs as required.
6. Leakage factor allowable shall be 5% based on the total operating cfm of the section of duct under testing.
7. Tested sections of ductwork shall be visually marked with certification sticker and initials of field test inspector. Tests shall be made before duct sections are concealed.

3.5 TEST AND BALANCE REPORT

A. The report shall contain the following data:

1. A listing of the measured air quantities at each outlet corresponding to the temperature tabulation specified above.
2. Air quantities at each return and exhaust air handling device (only if ducted return systems).
3. Static pressure readings entering and leaving each supply, return and exhaust fan, filter, and coil of the system. These readings shall be related to fan curves in terms of cfm handled.
4. Water pressure readings at gauge connections. Pressure readings at coils and pumps shall be related to coils and pump curves in terms of gpm handled.
5. Motor current readings at each fan and pump. The voltages at the time of the readings shall be listed.

3.6 FINAL ACCEPTANCE

- A. At the time of final inspection, the Balancing Agency shall recheck, in the presence of the Owner's Representative, specific and random selections of data, i.e., water and air quantities, recorded in the Certified Report.
- B. Points and areas for recheck shall be selected by the Owner's Representative.
- C. Measurement and test procedures shall be the same as approved for work forming basis of Certified Report.

- D. Selections for recheck, specific plus random, will not normally exceed 25% of the total number tabulated in the report, except that special air systems may require a complete recheck for safety reasons.
- E. If random tests elicit a measured flow deviation of 10% or more from that recorded in the Certified Report on 10% or more of the selected recheck stations, the report shall be automatically rejected. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, new Certified Report submitted, and new inspection tests made, all at no additional cost to the Owner.
- F. Following final acceptance of the Certified Report by the Owner's Representative, the settings of all valves, splitter, dampers, and other adjustment devices shall be permanently marked by the TAB Agency, so that adjustment can be restored if disturbed at any time. Devices shall not be marked until after final acceptance.

END OF SECTION 230593

and thermostatic controls in connection with these systems, shall be performed by a C-20 – Warm-Air Heating, Ventilating and Air-Conditioning Contractor.

2. All hydronic piping systems shall be performed by a C-4 – Boiler, Hot Water Heating and Steam Fitting Contractor.
3. All hydronic piping insulation shall be performed by a C-2 – Insulation and Acoustical Contractor.

1.5 SUBMITTALS

A. General Requirements

1. Submittal lists and drawings shall include identifying marks assigned by the Drawings and Specifications.
2. Review of drawings and other material submitted shall not be construed as complete check or constitute a waiver of the requirements of the Drawings and Specifications, but will indicate that the material submitted is acceptable in quality and utility. This review shall not relieve the Contractor of the responsibility to fit the proposed materials to the spaces provided, and to effect necessary rearrangements or construction of other work.
3. All fixtures, materials, and equipment equal in quality and utility to these herein mentioned will be accepted. When specific names are used in describing fixtures, materials, and equipment they are mentioned as standards only, but this implies no right on the part of the Contractor to use other fixtures, material, and equipment or methods, unless approved as equal in quality and utility by the Architect.
4. Before any fixtures, materials, or equipment are purchased, the Contractor shall submit to the Architect for approval, a complete list of materials, fixtures, and equipment, giving the manufacturer's names, catalog number, capacity, size, power requirements, etc.
5. The Contractor shall submit for the approval of the Architect, shop drawings of proposed material and equipment that differ from the specified materials and equipment, and of any specified materials and equipment with special conditions and/or arrangements. These drawings shall show necessary modifications of owner, plumbing, electrical, and mechanical work required by the proposed materials and equipment.

B. Submittal – Product Data

1. Submit manufacturer's product data for all HVAC equipment, in compliance with

1.6 COOPERATION WITH OTHER TRADES

- A. Cooperate fully with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Structural, Plumbing, and Electrical Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with or require coordination with the work of this Section, and schedule this work accordingly.
- B. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to Owner.

1.7 DIVISION OF WORK BETWEEN DIVISIONS 23 AND 26

- A. Close coordination between the electrical and mechanical trades is a part of the work that is required by this contract. No allowance will be made for omissions based on incorrectly

assuming another trade will be performing your work. Confirm your scope of work with the general contractor.

- B. The division of responsibilities between trades supplying equipment in other Divisions may be different. For instance, Division 26 contractor may be required to supply disconnect switches and starters for non-HVAC mechanical equipment supplied under other Divisions.
- C. Division 23 Responsibilities
 - 1. Assume responsibility for the proper functioning of the HVAC systems in their entirety.
 - 2. Furnish and install all conductors and conduit required for control of HVAC equipment.
 - 3. Make all terminations with the exception of power conductors.
 - 4. Furnish and install all control panels and devices to provide a complete and functional controls system, including all controls transformers.
 - 5. Furnish and install motor starters for all equipment specified in Division 23.
 - 6. Install duct smoke detectors furnished by fire alarm contractor in buildings with fire alarm systems.
 - 7. Furnish and install duct smoke detectors in buildings without fire alarm systems.
 - 8. Furnish and install all control conductors and conduit connecting duct smoke detectors to smoke dampers and fan start controls.
 - 9. All electrical work performed under Division 23 shall conform to the requirements of Division 26.
- D. Division 26 Responsibilities
 - 1. Furnish and install all raceways, conduit, disconnect switches, and conductors necessary for electrical power supply.
 - 2. Make all power supply terminations to motors, starters, disconnect switches, control transformers, and other mechanical devices.
 - 3. Fire alarm contractor to furnish duct smoke detectors in buildings with fire alarm systems.
 - 4. Provide power to all duct smoke detectors and smoke dampers.
 - 5. Coordinate all work with mechanical contractors.

1.8 AS-BUILT DRAWINGS

- A. A complete set of Contract Drawings shall be maintained at the work site, and all changes in the work shall be recorded on this set, on a daily basis. The final as-built drawings shall be submitted to the Architect for approval.

1.9 DESIGN DRAWINGS

- A. The drawings indicate diagrammatically the general layout of the mechanical systems and other related work. Field verification of scaled dimensions taken from the Drawings is required.
- B. The Contractor shall review and compare the Architectural, Structural, Plumbing, Mechanical, and Electrical Drawings and all Owner supplied equipment Drawings, and adjust their work to be in conformity with the conditions indicated thereon. Discrepancies between drawings, between drawings and actual field conditions, or between Drawings and Specifications, shall promptly be brought to the attention of the Architect for a determination of the modifications to

be effected. In the event that a major modification is required, a Change Order will be prepared.

1.10 VERIFICATION OF EXISTING CONDITIONS AND DEMOLITION

- A. Before installation of any new work, verify the location, size, and other conditions at all points of connection to services or other existing piping, and at all locations where new work will cross or pass near existing piping, electrical, or other facilities.
- B. Remove ductwork, piping, controls, fixtures, and equipment that is not to remain in service as shown on the Drawings or as required. This included the removal of associated appurtenances and supports.
- C. Patch, cap, or repair existing works affected by this demolition in concealed spaces within six (6) inches of a live main or branch.
- D. Deliver removed material to the Owner as directed by the Architect. Dispose of all other removed material offsite.
- E. Information shown relative to existing services is based upon available records and data during preparation of the Drawings, but shall be verified. Make reasonable deviations found necessary to conform to actual locations and conditions, without extra charge.

1.11 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Furnish three sets of typewritten instructions covering maintenance, adjustment, and operation of each piece of apparatus, bound in a hard cover loose-leaf binder. Neatly obscure or cross out inapplicable data from manufacturer's literature. Submit data to the Architect.
- B. Operating instructions shall show sequence of operations, lubrication, care, and maintenance requirements of all equipment. Final acceptance of the work will not be made until a satisfactory submission of this material is received and approved by the Architect.
- C. The Owner's authorized representative shall be instructed in the operation and servicing of all HVAC & plumbing systems.

1.12 ACCURACY OF DATA

- A. The data given herein and on the Drawings are as exact as could be reasonably secured, but absolute accuracy is not guaranteed. Exact locations, distances, elevations, etc. will be governed by shop drawings, the building itself, and actual field conditions.

1.13 DAMAGE BY LEAKS

- A. Contractor shall be responsible for any damage to work of other Contractors that is caused by leaks in any temporary or permanent piping systems due to pipe rupture, disconnected pipes or fittings, or by overflow of equipment.

1.14 SEISMIC FORCE RESISTANCE: MECHANICAL, PLUMBING, FIRE PROTECTION SYSTEMS

- A. All mechanical systems and plumbing piping systems shall adhere to the SMACNA “Seismic Restraint Manual: Guidelines for Mechanical Systems,” Third Edition dated March 2008.

1.15 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall be responsible for delivery, storage, protection, and placing of all equipment and materials.
 - 1. Contractor shall protect the work and materials from damage during construction. Equipment stored at the job site shall be protected from dust, water, or other damage, and be covered if equipment is exposed to weather. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.
 - 2. Any items damaged shall be repaired or replaced, at no additional cost to the Owner.
- B. Cleanliness of Piping and Equipment Systems
 - 1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading, and welding of piping.
 - 2. Piping systems shall be flushed, blown, or pigged as necessary to deliver clean systems.
 - 3. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

1.16 WARRANTIES

- A. Equipment warranties shall be provided for all equipment, with all necessary information filled in, except purchase date, in favor of the Owner.
- B. The contractor shall guarantee that all work under this Section is free from defects in material and workmanship for a period of one year from the date of filing the Notice of Completion. Replacement of defective work and damage caused to work of other trades as a result of such defective work shall be the responsibility of the Contractor, and shall be made at no cost to the Owner.

1.17 ALTERNATIVE MATERIALS AND METHODS

- A. These plans and specifications describe the general scope of the mechanical systems. These plans and specifications do not preclude the submittal of alternative methods or materials. Manufacturer’s names and catalog numbers are stated to identify the type and quality of the equipment or materials required for the project.
- B. The contractor may submit shop drawings and/or technical information on alternative equipment, materials or installation details to accomplish the intent of the plans and specifications. Approval of the alternative equipment, materials or installation details shall not relieve the contractor of any responsibility for complying with the intent of the plans and specifications. Submit the manufacturers' technical information, shop drawings, and/or written description of alternative methods for each item described by manufacturer's name and catalog number and for each component, equipment, material, or installation detail required.

1.18 SITE EXAMINATION

- A. Thoroughly examine the site and verify the actual work conditions. No extra compensation will be allowed for expenses due to failure to discover site conditions which affect the work.

PART 2 – PRODUCTS

2.1 GENERAL

- A. All materials, appliances, and equipment shall be new and best of their respective kinds, free from defects, and of the make, brand, or quality specified or as accepted by the Architect.
- B. When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.
- C. Apply and install all items in accordance with manufacturer's written instructions. Refer conflicts between manufacturer's instructions and the contract drawings and specifications to the Architect for resolution.

2.2 THERMOSTATS

- A. Electric, solid-state, microcomputer-based room thermostat with the following features.
 - 1. Automatic switching from heating to cooling.
 - 2. Preferential rate control to minimize overshoot and deviation from set point.
 - 3. Set up for four separate temperatures per day.
 - 4. Instant override of set point for continuous or timed period from 1 hour to 31 days.
 - 5. Short-cycle protection.
 - 6. Programming based on every day of week.
 - 7. Selection features include degree F or degree C display, 12- or 24-hour clock, keyboard disable, remote sensor, and fan on-auto.
 - 8. Battery replacement without program loss.
 - 9. Thermostat display features include the following:
 - a. Time of day.
 - b. Actual room temperature.
 - c. Programmed temperature.
 - d. Programmed time.
 - e. Duration of timed override.
 - f. Day of week.
 - g. System mode indications include "heating," "off," "fan auto," and "fan on."
- B. Thermostat Cover Construction: Heavy-duty, locking thermostat guard, of solid metal tamperproof construction.
- C. Accuracy: Plus or minus 0.5 deg. F at calibration point.
- D. Wire: Twisted, shielded-pair cable.
- E. Contractor shall field verify dimensions prior to ordering fan and curb adaptor.

2.3 DUCTWORK INSIDE BUILDING

A. Sheet Metal Ductwork - Rectangular

1. Ducts and plenums shall be fabricated and installed in conformance with the latest editions of: NFPA Pamphlet No. 90A; California Building Code; California Mechanical Code and the SMACNA HVAC Duct Construction Standards (Metal and Flexible). Ducts and plenums shall be constructed of hot dipped galvanized mild steel and shall have airtight Class "B" seals at all transverse joints and longitudinal seams. Tables and figures hereinafter referenced are from the 2005 edition of the SMACNA HVAC Duct Construction Standards (Metal and Flexible).
2. Rectangular duct construction shall conform to Table 2-3. All transverse joints shall be flanged per Table 2-32, with corner closures or "Duct Mate" flanged connections with corner closures per Figure 2-17. Elbows shall be standard radius (Type RE 1) or square throat with vanes (Type RE 2) per Figure 4-2, with double thickness turning vanes per Figures 4-3 and 4-4. Offsets and transitions shall be per Figure 4-7. Supply, return, and exhaust branch connections shall be per Figure 4-5 or 4-6. Splitters shall not be used.
3. Lined ducts shall be fabricated such that the net inside dimensions equals the duct sizes shown on the Drawings.

B. Sheet Metal Ductwork - Spiral

1. Round ducts shall be spiral, United McGill or equal. All transverse joints and longitudinal seams shall have Class "B" seals. All branches in round duct systems shall be made with factory fabricated reducing wye branches. Duct turns shall be made with standard, factory fabricated, three-piece elbows.

C. Flexible Ductwork

1. Flexible ducts shall be Flexmaster "8M" or approved equal. Flexible ducts shall be used only where shown on the Drawings, and maximum length of any given flexible duct shall not exceed 5 ft. Galvanized sheet metal elbows shall be used for turns greater than 45° on flexible ducts 10" and larger. Connections to rectangular ducts shall be made with "spin-in" fittings with air scoops. The installation of flexible ducts shall conform to Figure 3-10, with the exceptions noted herein.

D. Supports

1. Supports for horizontal ducts and plenums shall be fabricated per Figures 5-5 and 5-6 and Tables 5-1, 5-2, and 5-3. The maximum distance between hangers shall be eight feet for rectangular ducts and twelve feet for round ducts. Attachments to the structure shall be made with adequately sized lag bolts for straphangers and adequately sized machine bolts and side beam brackets for rod hangers. Supports for vertical ducts shall be band iron strap or angle bracket type per Figure 5-8 and 5-9.

E. Specialties:

1. Duct Access Doors: Including those for removing filters, duct access doors shall be as detailed in Figure 7-2 with sash locks, piano hinges, and gaskets. Access doors shall have an unobstructed full swing.

2.4 DUCTWORK OUTSIDE BUILDING

- A. Product: Therma duct or approved equal. Architect and Engineer shall determine the acceptability of a product other than Therma duct.
- B. The panel shall be manufactured of CFC-free Kingspan Kooltherm closed cell rigid thermoset resin thermally bonded on both sides to a factory applied .001" (25 micron) aluminum foil facing reinforced with a fiberglass scrim. An added UV stable, IR reflective 1000-micron high impact resistant titanium infused vinyl is factory bonded using a full lamination process. The lamination process shall permanently bond the vinyl clad to the outer surfaces of the phenolic foam panel to provide a zero-permeability water tight barrier and to form a structurally insulated panel (SIP) in which to form duct segments. Processes that do not employ a full lamination process are not acceptable. Self-applied adhesives such as tapes, caulks or cladding that incorporate pressure sensitive or spray adhesives are not acceptable.
- C. The thermal conductivity shall be no greater than $0.13 \text{ BTU} \cdot \text{in}/\text{Hr} \cdot \text{ft}^2 \cdot ^\circ\text{F}$ ($.018 \text{ W}/\text{m} \cdot ^\circ\text{C}$), the thermal conductivity shall be no greater than $0.13 \text{ BTU} \cdot \text{in}/\text{Hr} \cdot \text{ft}^2 \cdot ^\circ\text{F}$ ($.018 \text{ W}/\text{m} \cdot ^\circ\text{C}$)
- D. The density of the Kooltherm foam shall not be less than 3.5 pcf (56 Kg/m³) with a minimum compressive strength of 28 psi (.2 MPa).
- E. The standard panel is (31 mm) thickness panel with R-8.1 (1.5 RSI) shall be utilized unless indicated otherwise on the print.
1. Maximum Temperature: Continuous rating of 185 degrees F (70 deg C) inside ducts or ambient temperature surrounding ducts.
 2. Maximum Thermal Conductivity: $0.13 \text{ Btu} \cdot \text{in.}/\text{h} \cdot \text{sq. ft.} \cdot \text{deg F}$ at 75 deg F mean temperature.
 3. Permeability: 0.00 perms maximum when tested according to ASTM E 96/E 96M, Procedure A.
 4. Antimicrobial Agent: Additive for antimicrobial shall not be used but instead, raw product must pass UL bacteria growth testing.
 5. Noise-Reduction Coefficient: 0.05 minimum when tested according to ASTM C 423, Mounting A.
 6. Required Markings: All interior duct liner shall bear UL label and other markings required by UL 181 on each full sheet of duct panel; UL ratings for internal closure materials.
 7. All insulation materials shall be closed cell with a closed cell content of >90%.
 8. R-value:
 - a. 1 3/16 inch (31 mm) Thick Panel: 8.1 R
 - b. 1 3/4 (45 mm) Thick Panel: 12 R
 - c. 2 1/16" Double wall (55 mm): 14.1 R
 - d. 2 3/8" Double wall (62 mm) Thick Panel: 16.2 R
 - e. 3" Double wall (76 mm) Thick Panel: 20.1 R
 - f. 3.5" Double wall (100 mm) Thick Panel 24 R
- F. Closure Materials:

1. V-Groove Adhesive: Silicone (interior only).
2. UV stable 1000 micron high impact resistant titanium infused vinyl (exterior).
 - a. Factory manufactured seamless corners for zero perms.
 - b. Cohesive bonded over-lap at corner seam covers for zero perms.
 - c. Water resistant titanium infused welded vinyl seams.
 - d. Mold and mildew resistant.
3. Polymeric Sealing System:
 - a. Structural Membrane: Aluminum scrim with woven glass fiber with UV stable vinyl clad applied
 - b. Minimum Seam Cover Width: 2 7/8" inches (75 mm)
 - c. Sealant: Low VOC.
 - d. Color: White (colors, matched by architect optional).
 - e. Water resistant.
 - f. Mold and mildew resistant.
4. Duct Connectors.
 - a. Factory manufactured galvanized 4-bolt flange.

G. Outdoor Cladding

1. Thermaduct outdoor Installations: Duct segments shall incorporate UV stable 1000 micron high impact resistant titanium infused vinyl which is introduced during the manufacturing process.

H. Flange coverings

1. Flanges are field sealed airtight before flange covers are installed. Flange covering consists of the following:
 - a.. Foam tape insulation with molded 39 mil covers.
 - b. Air gap (heating only application) with molded 39 mil covers.

I. Reinforcement

1. Thermaduct shall provide designed and built with adequate reinforcement to both; withstand air pressure forces from within the duct from blower pressure and shall be built to handle expected snow load for the location where the Thermaduct is being installed. Thermaduct will employ Airtruss™ reinforcement system when both specified static pressure and duct sizes dictate the need. This is a factory installed system and no field installation of the reinforcement system is required.

J. Weight

1. Thermaduct shall provide low weight stresses on the building framing and support members. Assembled Thermaduct shall have a weight of 0.86 lbs. per square foot to maximum weight of 2.7 lbs. per square foot (depending on R-value and reinforcement

requirement). Hangers and tie-downs are to be detailed on the manufacturer's installing contractors detail drawings prior to installation but not exceeding 13' for duct girth <84" and 8' for duct girth >85" between hangers and designed to carry the weight and wind load of the ductwork.

2.5 DUCTWORK ACCESSORIES

A. Flexible Duct Connections

1. Duro-Dyne "Metal-Fab" with Duroion, Ventfabrics "Ventglass," or approved equal.
2. Install at each point where a blower unit is connected to a duct. A minimum clearance of three inches between the duct and the source of vibration shall be maintained. Install per Figure 2-17.

B. Screens

1. Install removable bird screens at all outside intakes and exhaust air discharges. Screens shall be fabricated from 1/2" x 14 gauge mesh secured in full frames. Screens and frames shall be constructed of the same material as the duct, hood, or equipment to which attached.

C. Joints

1. Tape all joints airtight using Hardcast type "DT" pressureless tape and "HD-20" adhesive, per manufacturer's directions.

D. Dampers

1. Provide butterfly or multi-blade dampers where indicated on the Drawings or as required for balancing air quantities to values shown without generating excessive noise. Provide Duro-Dyne "KS-385," or approved equal, locking quadrants on each manual damper. Locate dampers in furred ceilings near access panels where possible.
 - a. Butterfly dampers shall be constructed as per Figure 7-4, Figure A, B, and C in the duct manual.
 - b. Multi-blade dampers shall conform to Figure 7-5.
 - c. Back-draft dampers shall be Air Balance "Air Dynamic" model DY-1002-V, or equal.

2.6 INSULATION – INTERIOR DUCTWORK ONLY

A. Exterior of Ductwork:

1. Unless specified to be lined, all sheet metal supply and return ducts in indirectly conditioned spaces shall be insulated on the outside with Johns Manville "Microlite XG" flexible fiberglass blanket-type duct wrap, with factory applied FSK aluminum foil facing, with a composite UL rating of 25/50, minimum R-6 installed.
2. Unless specified to be lined, all sheet metal supply and return ducts in unconditioned spaces shall be insulated on the outside with Johns Manville "Microlite XG" flexible fiberglass blanket-type duct wrap, with factory applied FSK aluminum foil facing, with a composite UL rating of 25/50, minimum R-8 installed.

3. All outside air ductwork between building outside air inlet and HVAC unit or heat/energy recovery ventilator shall be insulated on the outside with Johns Manville “Microlite XG” flexible fiberglass blanket-type duct wrap, with factory applied FSK aluminum foil facing, with a composite UL rating of 25/50, minimum R-4 installed.
4. Exhaust ductwork within 10 feet of termination point and between any heat/energy recovery ventilator and exhaust termination shall be insulated on the outside with Johns Manville “Microlite XG” flexible fiberglass blanket-type duct wrap, with factory applied FSK aluminum foil facing, with a composite UL rating of 25/50, minimum R-4 installed.

B. Interior of Ductwork:

1. Duct lining shall be installed in supply and return ducts and plenums where noted on the Drawings. Lining shall be Johns Manville “PermacoteLinacoustic R” rigid fiberglass board for plenums and “PermacoteLinacoustic HP” fiberglass duct liner for ducts, 1” thick, unless otherwise noted, with fire resistant coating. Duct liner shall meet ASTM C 1071, with air surface coated with acrylic coating treated with EPA registered anti-microbial agent prove to resist microbial growth as determined by ASTM G 21 and G 22. Insulation with torn or broken coating shall be removed and replaced. Loose corners, edges, and butt joints will not be accepted.
2. All exposed exterior supply and return ductwork shall have minimum 2” interior insulation, as specified in this section.
3. Maximum velocity: 5,000 ft/min.
4. Fasteners: duct liner galvanized steel pins, welded or mechanically fastened.
5. Developed smoke density shall not exceed 50. Flame spread rating shall not exceed 25.

2.7 REFRIGERATION PIPING AND APPURTENANCES

- A. Refrigerant piping shall be Type “ACR” de-oxidized hard temper copper tube, ASTM B280.
- B. Mechanical joints on refrigerant piping systems are prohibited. All refrigerant piping joints shall be brazed. Use lead-free, silver solder, minimum 15% silver content.
- C. Pipe fittings shall be wrought-copper with soldered joints, ASME B16.22.
- D. Flexible connections shall be bronze, double braided, sweat solder ends.
- E. Moisture/liquid indicators (sight glasses) shall be color change moisture indication type, replaceable element, filter screen and pad, sweat solder ends; Sporlan “See-All”, Henry, or equal.
- F. Charging and purge valves shall be forged brass, diaphragm packless, globe type, angle or straight through, one end solder, one end flare; Henry 623 and 643 series, Sporlan or equal.
- G. Solenoid valves shall be forged brass, extended end connections, solder ends, molded coil; Sporlan “E” series or equal. Comply with ARI 760 & UL 429.
- H. Filter driers shall be replaceable media, angle type; Henry “Dri-Cor” or equal; ARI 730.
- I. Thermostatic expansion valves shall have forged brass body, stainless steel seats and pins, ODF solder connections, external equalizer,; ARI 750.

- J. Outdoor condensing units shall have a flexible piping section at the outdoor unit.
- K. Refrigerant piping between the indoor branch selector boxes and the individual air handling units may be pre-insulated line sets, IsoClima or equal. Pre-insulated with expanded polyethylene sheath, closed cell with external LDPE foil. Piping shall be crimped closed for safety. Tested in accordance with UL94 for Surface Burning Characteristics, UL723A for Flame/Smoke Index and UL746A for Ignition Resistance. Copper shall be ASTM B280 approved.

2.8 REGISTERS, GRILLES, AND DIFFUSERS

- A. Air terminals shall be Titus, equivalent Nailor, or approved equal, as scheduled on the Drawings.
- B. All terminals shall be steel and shall be factory painted "off-white," unless otherwise noted. Air terminals for installation in gypsum board shall have a 1" border for surface mounting.

2.9 ACCESS PANELS

- A. Where construction is not inherently accessible, provide adequately sized and conveniently located access doors in ceilings, walls, and furring for servicing valves, equipment, etc. Doors shall be delivered to the General Contractor for installation.
- B. Fire Rated: Inryco/Milcor, U.L. listed, "B" label, 1 ½ hour rating. Minimum size shall be 12" x 12". Provide larger sizes where required. Locks shall be flush screwdriver operated.
- C. Drywalled Surfaces: Inryco/Milcor, Style DW, prime coated steel. Minimum size shall be 12" x 12". Provide larger sizes where required. Locks shall be flush screwdriver operated.
- D. Concrete and Tiled Surfaces: Inryco/Milcor, Style M, prime coated steel, except access panels installed in tiled surfaces shall be stain finish stainless steel. Minimum size shall be 12" x 12". Provide larger sizes where required. Locks shall be flush screwdriver operated.
- E. Plastered Surfaces: Inryco/Milcor, Style K, prime coated steel. Minimum size shall be 12" x 12". Provide larger sizes where required. Locks shall be flush screwdriver operated.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

- A. Provide all necessary cutting in connection with the work of the Section. No cutting shall be done without the approval of the Architect. Comply with requirements specified in Cutting and Patching Section.
- B. No structural members shall be drilled, bored, or notched in a manner that will impair their structural capacity.
- C. All penetrations of concrete or masonry shall be made with core drills.

3.2 EQUIPMENT STARTUP

- A. Notify the Owner's representative a minimum of two weeks prior to equipment startup date to allow for Owner's personnel to be present during startup.
- B. Manufacturer must provide a service technician to supervise rigging of the units to ensure proper fit.
- C. Unit must be checked out, tested and placed into operation by the installing contractor under the supervision of an authorized representative of the factory.
- D. Controls contractor must be present during startup to ensure that factory-installed controls have been adequately installed, wired, and integrated into the building managements system.
- E. Provide minimum eight (8) hours of training time with Owner's maintenance personnel to thoroughly review new equipment, maintenance requirements, and equipment controls.
- F. During startup, the full functionality of the equipment shall be demonstrated to the satisfaction of the Owner's representative, including heating, mechanical cooling, economizer cooling, zone modulation, and all emergency shutdown features.

3.3 EQUIPMENT, GENERAL REQUIREMENTS

- A. Equipment shall operate quietly and without objectionable vibration. Such problems, other than from equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated at the direction of the Architect.
- B. Install equipment to provide good appearance, easy access, and adequate space to allow replacement and maintenance. Provide bases, supports, anchor bolts, and other items required to achieve this. Installation shall be level, above moisture level, and adequately braced.
- C. Thoroughly lubricate equipment before operating. Repair of damage resulting from failure to comply with this requirement shall be the Contractor's responsibility.
- D. Connections to piping shall be secured and properly aligned and all utility and control connections shall be properly isolated from the building structure by means of vibration isolators and flexible connections. Any equipment not meeting this requirement will be modified and reinstalled at no expense to the Owner.
- E. Move equipment into building through available openings. Dismantle equipment where necessary to accomplish this. After reassembly, test equipment to verify its satisfactory operating condition.

3.4 DUCTWORK

- A. All ductwork shall be installed within spaces provided where possible. Ducts shall be installed true to line and grade, fully secured to structural faming with specified hangers and supports, insulated, and vibration isolated, where required.
- B. Each section of supply air ductwork shall be cleaned at the shop, dust and oil free, using a degreasing agent and detergent and sealed airtight at both ends with visqueen and tape. Supply

ducts shall be additionally cleaned with a disinfecting solution. Ends of all supply and internally insulated exhaust ducts shall be kept sealed until the time they are jointed. When duct sections are joined, wipe down all interior surfaces with a clean tack cloth. If tack cloth shows any dust, then re-clean duct as described above. The intent is that no foreign matter be allowed to enter the ductwork at any time after factory cleaning and during construction.

3.5 THERMADUCT OUTDOOR DUCTWORK

A. Certification:

1. Ducts shall be detailed and fully factory manufactured by an authorized Thermaduct, LLC facility system. All fabrication labor will be certified "yellow label" building trade professionals, compliant to SMWIA and SMACNA labor guidelines (work preservation observed).

B. Fabrication:

1. Fabricated joints, seams, transitions, reinforcement, elbows, branch connections, access doors and panels, and damage repairs according to manufacturer's written and detailed instructions.
2. Fabricated 90-degree mitered elbows to include turning vanes.
3. Fabricated duct segments in accordance with manufacturer's written details.
4. Duct Fittings shall include 6 inches of connecting material, as measured, from last bend line to the end of the duct. Connections on machine manufactured duct may be 4 inches.
5. Fabricated duct segments utilizing v-groove method of fabrication. Factory welded or cohesively bonded seams will apply to fully manufactured ductwork and fittings. Internal seams will be supplied with an unbroken layer of low VOC silicone or bonding (for paint shop applications). Each duct segment will be factory supplied with either aluminum grip pro-file or pre-insulated duct connectors in accordance with manufacturer's detailed submittal guide. Applied duct reinforcement to protect against side deformation from both positive and negative pressure per manufacturer's design guide based on specified ductwork size and system pressure.
6. Designed and fabricated duct segments and fittings will be in accordance with "SMACNA Duct Construction Standards" latest edition.
7. Both positive and negative ductwork and fittings shall be constructed to incorporate a UL Listed as a Class 1 air duct to Standard for Safety UL 181 liner with an exterior clad for permanent protection against water intrusion.
8. Duct shall be constructed to exceed requirements for snow and wind loads.

C. Duct segments shall be installed by competent HVAC installers.

D. Install ducts and fittings to comply with manufacturer's installation instructions as follows:

1. Install ducts with fewest possible joints.
2. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
3. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
4. Protect duct interiors from the moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

5. Use prescribed duct support spacing as described in this specification and manufacturer's recommendations.
- E. Air Leakage: Duct air leakage rates to be in compliance with "SMACNA HVAC Duct Construction Standards" latest version per applicable leakage class based on pressure.
- F. Contractor to ensure that the ductwork system is properly and adequately supported.
 1. Ensure that the chosen method is compatible with the specific ductwork system requirements per Therma duct installation detail drawings. Pre-installation should be provided prior to work commencement by installing contractor for approval. .
 2. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- G. Supports on straight runs of ductwork shall be positioned at centers not exceeding 13 feet (3.96 m) for duct sections when fabricated in 13 foot (3.96 m) lengths with duct girth less than 84". Larger duct sizes and short segments with duct girth greater than 84" are to be supported at 8 foot centers or less, in accordance with the Therma duct installation details provided prior to work commencement.
- H. Ductwork shall be supported at changes of direction, at branch duct connections, tee fittings, parallel under turning vanes and all duct accessories such as dampers, etc.
- I. The load of such accessories to the ductwork shall be neutralized by the accessory support.
- J. Inspection: Arrange for manufacturer's representative to inspect completed installation and provide written report that installation complies with manufacturer's written instructions.
 1. Remove and replace duct system where inspection indicates that it does not comply with specified requirements.
- K. Perform additional testing and inspecting, at the Contractor's expense, to determine compliance of replaced or additional work with specified requirements.
- L. Outdoor Ducts and Fittings:
 1. Therma duct Rectangular Ducts and Fittings:
 - a. Minimum Panel Thickness: 31 mm
 - b. Cladding: minimum 0.038 inch

3.6 CONTROLS

- A. This Contractor shall provide all required control components, including but not limited to thermostats, temperature sensors, static pressure sensors, humidity sensors, damper actuators, valve actuators, unitary controllers, relays, and low-voltage wiring, such that the Owner is provided with a fully functional control system.

- B. Where work is performed in an existing building, this Contractor shall integrate all control modifications into the existing building control system, if applicable. Specific requirements shall be coordinated with Owner and approved by Architect prior to installation.
- C. Installation of the system shall be made under the supervision of the manufacturer of the equipment, or his factory authorized representative.
- D. In addition to the submittals required above, and those set forth in "Submittals," the following items shall be furnished.
 - 1. In an existing building, this Contractor shall furnish a document that describes the proposed materials methods for integration into the existing building management system, if applicable.
 - 2. Prior to final inspection, the system contractor shall furnish a letter stating that the entire control system and all interlock wiring is installed and operating in a satisfactory manner.

3.7 THERMOSTAT

- A. Room thermostats shall be installed in the locations indicated on the Contract Drawings. Final locations shall be coordinated with Owner's maintenance personnel and shall be installed in locations which shall provide representative temperatures for the adjacent areas.
- B. Low voltage control wiring and conduit shall be installed in accordance with requirements of Division 26.

3.8 INSULATION

- A. Exterior Ductwork:
 - 1. The insulation shall be cut longer than the perimeter of the duct to provide 2" staple lap and minimum compression at the corners. All joints shall be lapped 2' and stapled with outward clinching staples 2" on center. The insulation shall be mechanically fastened to the underside of all ducts 24" wide or more using cup-head pins, weld pins, or stick pins with speed clips 18" on center. All joints and penetrations of the vapor barrier jacket shall be sealed with a minimum 3" wide matching pressure sensitive tape. Pressure-sensitive tape shall be firmly rubbed in place immediately after application using a "squeegee" type tool.
 - 2. When a vapor seal is required, two coats of vapor retarder mastic reinforced with one layer of 4" wide, open weave glass fabric may be used in lieu of pressure-sensitive tape. Mastic shall be brushed onto joint and glass fabric until the fabric is filled. Mastics shall be applied in accordance with application instructions on the container.
- B. Interior Duct Liner
 - 1. Apply to the inside face of ducts, coated side facing air stream, fasten using fire retardant adhesive meeting ASTM C 9169, and secure with mechanical liner fasteners at 24" maximum o.c., both directions. Pin length should be such as to limit compression of liner.
 - 2. Exposed edges must be factory or field coated. For systems operating at 4000 fpm or higher, a metal nosing must be installed on all liner leading edges. Insulation with torn or broken coatings shall be removed or replaced. Loose corners, edges, and butt joints will not be accepted.

C. Refrigerant Piping

1. The insulation shall be installed in accordance with the manufacturer's instructions. All joints and seams shall be sealed with waterproof vapor retardant adhesive. All pipes exposed to the weather shall be coated with aluminum jacketing to protect the insulation from ultra-violet radiation in accordance with the manufacturer's published instructions.

3.9 REFRIGERANT PIPING

- A. Piping shall be continuously purged with dry nitrogen while soldering. Care shall be taken when soldering near valves or other equipment that may be damaged by extreme heat.
- B. Refrigerant piping shall be tested for leaks under 500 psig pressure using an inert gas such as dry nitrogen. Joints shall be tested for leaks using soapsuds. (WARNING! OXYGEN OR ACETYLENE SHALL NOT BE USED IN PLACE OF DRY NITROGEN. A VIOLENT EXPLOSION MAY RESULT!). Be sure that all controls, relief valves, or rupture discs that could be damaged by test pressure are removed before beginning pressure test.
- C. Pressure and leak tests on refrigerant piping and equipment shall be done in accordance with local code requirements and the American Standard Safety Code for Mechanical Refrigeration (ASA B9.1).
- D. Pressure Testing Requirements:
1. A three-step pressure test shall be performed per the following:
 - a. Step 1 – Leak check at 149 psi for a minimum of 3 minutes.
 - b. Step 2- Leak check at 312 psi for a minimum of 5 minutes.
 - c. Step 3 – Leak check at 550 psi for a minimum of 24 hours.
- E. Evacuation Requirements:
1. The contractor shall notify the Architect 48 hours prior to the time and date of the evacuation.
 2. A vacuum pump specifically designed for use with R-410A shall be used to triple-evacuate the system per the following procedure:
 - a. Step 1 – Evacuate the system to 29" mercury and maintain for 20 minutes.
 - b. Step 2 – Break vacuum with dry nitrogen to a pressure of 2-3 psi and maintain for 15 minutes.
 - c. Step 3 – Evacuate the system to 29" mercury and maintain for 20 minutes.
 - d. Step 4 – Break vacuum with dry nitrogen to a pressure of 2-3 psi and maintain for 15 minutes.
 - e. Step 5 - Evacuate the system to 29" mercury and maintain for 20 minutes.
- F. The refrigerant charge shall be calculated and weighed into the system.
- G. After charging with refrigerant, all joints shall be tested with an electric halide leak detector. Precautions should be taken to keep moisture out of the system, and a drier shall be used.

- H. Service technicians shall be certified in the use of CFC and HCFC refrigerant recovery and recycling equipment and he/she shall use UL listed and labeled recovery equipment when discharging refrigerant.

3.10 SUPPORTS AND HANGERS

- A. All hangers, supports, and attachments to the structure must be capable of withstanding three times the anticipated load.

3.11 TEST, INSPECTIONS

- A. Make all necessary control adjustments and balancing of air and water flows. Operate the entire system for a period of time not less than three (3) working days for the purpose of proving satisfactory performance. During this period, instruct such persons as the Owner and/or Architect may designate in the proper operation of the systems. Should further adjustment prove necessary, operating tests shall be repeated until a satisfactory test is obtained.
- B. This Contractor shall not allow or cause any work of this Section to be covered or enclosed until it has been inspected, tested, and approved by the Architect and the authorities having jurisdiction over the work. Should any of this work be enclosed or covered up before such inspection, testing, and approval, this Contractor shall uncover the work, have the necessary inspections, tests, and approvals made and, at no expense to the Owner, make all repairs necessary to restore both his work and that of other contractors which may have been damaged to be in conformity with the Contract Documents.

3.12 CLEANUP

- A. Upon completion of the work of this Section, remove all material, debris, and equipment associated with or used in the performance of this work.

END OF SECTION 230000

1.2 LICENSES, PERMITS, AND FEES

- A. The Contractor shall provide, procure, and pay for all licenses, permits, fees, etc. as required to carry on and complete their work.

1.3 CODES AND STANDARDS

- A. All work shall be done in code with all applicable local, state, and federal building safety codes, ordinances, and regulations. Additionally, all work shall conform to the latest editions of the following standards:
 - 1. National Fire Protection Association.
 - 2. California Mechanical Code.
 - 3. California Plumbing Code.
 - 4. Underwriters Laboratories.
 - 5. Titles 8, 17, 19, 21, 24 of the California Code of Regulations.
 - 6. California Electric Code.
- B. When the Contract Documents call for materials or construction of a higher standard than is required by the above, the Contract Document requirements shall take precedence over the requirements of the applicable laws, ordinances, rules, or regulations. Nothing in the Contract Documents shall be interpreted as permitting work in violation of said laws, rules, and/or regulations.
- C. The Contractor for this work shall furnish, without extra charge, any additional materials and/or labor as may be required for compliance with these laws, rules, and/or regulations though such materials and/or labor are not specially set forth in the Contract Documents.

1.4 LICENSING REQUIREMENTS

- A. All plumbing systems shall be installed by a C-36 Plumbing Contractor. Plumbing systems include: waste removal and connection of on-site waste disposal systems; piping, storage tanks, and venting for supply of gases and liquids for any purpose; all gas appliances, flues, and gas connections; water and gas piping from the Owner's side of utility meter to the structure or fixed works, installation of any type of equipment to heat water or fluids to a suitable temperature; and maintenance and replacement of the items described above, including health and safety devices.
- B. All hydronic piping systems shall be installed by a C-4 – Boiler, Hot Water Heating and Steam Fitting Contractor.
- C. All plumbing and hydronic piping insulation shall be performed by a C-2 – Insulation and Acoustical Contractor.

1.5 SUBMITTALS

- A. All fixtures, materials, and equipment equal in quality and utility to these herein mentioned will be accepted. When specific names are used in describing fixtures, materials, and equipment they are mentioned as standards only, but this implies no right on the part of the Contractor to

use other fixtures, material, and equipment or methods, unless approved as equal in quality and utility by the Architect.

- B. Before any fixtures, materials, or equipment are purchased, the Contractor shall submit to the Architect for approval, a complete list of materials, fixtures, and equipment, giving the manufacturer's names, model numbers, and catalog sheets.
- C. The Contractor shall submit for the approval of the Architect, shop drawings of proposed material and equipment that differ from the specified materials and equipment, and of any specified materials and equipment with special conditions and/or arrangements. These drawings shall show necessary modifications of owner, plumbing, electrical, and mechanical work required by the proposed materials and equipment.
- D. Submittal lists and drawings shall include identifying marks assigned by the Drawings and Specifications.
- E. Review of drawings and other material submitted shall not be construed as complete check or constitute a waiver of the requirements of the Drawings and Specifications, but will indicate that the material submitted is acceptable in quality and utility. This review shall not relieve the Contractor of the responsibility to fit the proposed materials to the spaces provided, and to effect necessary rearrangements or construction of other work.

1.6 COOPERATION WITH OTHER TRADES

- A. Cooperate fully with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Structural, Mechanical, and Electrical Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with or require coordination with the work of this Section, and schedule this work accordingly.
- B. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to Owner.

1.7 AS-BUILT DRAWINGS

- A. A complete set of Contract Drawings shall be maintained at the work site, and all changes in the work shall be recorded on this set, on a daily basis. The final as-built drawings shall be submitted to the Owner's Representative for approval.

1.8 DRAWINGS

- A. The drawings indicate diagrammatically the general layout of the plumbing systems and other related work. Field verification of scaled dimensions taken from the Drawings is required.
- B. The Contractor shall review and compare the Architectural, Structural, Plumbing, Mechanical, and Electrical Drawings and all Owner supplied equipment Drawings, and adjust their work to be in conformity with the conditions indicated thereon. Discrepancies between drawings, between drawings and actual field conditions, or between Drawings and Specifications, shall promptly be brought to the attention of the Architect for a determination of the modifications to be effected. In the event that a major modification is required, a Change Order will be prepared.

1.9 VERIFICATION OF EXISTING CONDITIONS AND DEMOLITION

- A. Before installation of any new work, verify the location, size, and other conditions at all points of connection to services or other existing piping, and at all locations where new work will cross or pass near existing piping, electrical, or other facilities.
- B. Patch, cap, or repair existing works affected by this demolition in concealed spaces within six (6) inches of a live main or branch.
- C. Deliver removed material to the Owner as directed by the Architect. Dispose of all other removed material offsite.
- D. Information shown relative to existing services is based upon available records and data during preparation of the Drawings, but shall be verified. Make reasonable deviations found necessary to conform to actual locations and conditions, without extra charge.
- E. The data given herein and on the Drawings are as exact as could be reasonably secured, but absolute accuracy is not guaranteed. Exact locations, distances, elevations, etc. will be governed by shop drawings, the building itself, and actual field conditions.

1.10 DAMAGE BY LEAKS

- A. Contractor shall be responsible for any damage to work of other Contractors that is caused by leaks in any temporary or permanent piping systems due to pipe rupture, disconnected pipes or fittings, or by overflow of equipment.

1.11 SEISMIC FORCE RESISTANCE: MECHANICAL, PLUMBING, FIRE PROTECTION SYSTEMS

- A. All mechanical systems and plumbing piping systems shall adhere to the SMACNA "Seismic Restraint Manual: Guidelines for Mechanical Systems," Third Edition, dated March 2008.
- B. Equipment:
 - 1. Each piece of equipment installed shall be constructed and anchored to structural supports to resist a seismic force of 150% of the equipment's operating weight in any direction. Supports, anchors, and braces shown shall be minimum.
 - 2. Equipment manufacturer shall design, construct, and certify that his equipment satisfies the special minimum seismic resistance requirements and shall submit calculations or test results supporting his certification.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall be responsible for delivery, storage, protection, and placing of all equipment and materials.
 - 1. Contractor shall protect the work and materials from damage during construction. Equipment stored at the job site shall be protected from dust, water, or other damage, and

be covered if equipment is exposed to weather. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.

2. Any items damaged shall be repaired or replaced, at no additional cost to the Owner.

B. Cleanliness of Piping and Equipment Systems

1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading, and welding of piping.
2. Piping systems shall be flushed, blown, or pigged as necessary to deliver clean systems.
3. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

1.13 WARRANTIES

- A. Equipment warranties shall be provided for all equipment, with all necessary information filled in, except purchase date, in favor of the Owner.
- B. The contractor shall guarantee that all work under this Section is free from defects in material and workmanship for a period of one year from the date of filing the Notice of Completion. Replacement of defective work and damage caused to work of other trades as a result of such defective work shall be the responsibility of the Contractor, and shall be made at no cost to the Owner.

1.14 ALTERNATIVE MATERIALS AND METHODS

- A. These plans and specifications describe the general scope of the mechanical systems. These plans and specifications do not preclude the submittal of alternative methods or materials. Manufacturer's names and catalog numbers are stated to identify the type and quality of the equipment or materials required for the project.
- B. The contractor may submit shop drawings and/or technical information on alternative equipment, materials or installation details to accomplish the intent of the plans and specifications. Approval of the alternative equipment, materials or installation details shall not relieve the contractor of any responsibility for complying with the intent of the plans and specifications. Submit the manufacturers' technical information, shop drawings, and/or written description of alternative methods for each item described by manufacturer's name and catalog number and for each component, equipment, material, or installation detail required.

1.15 SITE EXAMINATION

- A. Thoroughly examine the site and verify the actual work conditions. No extra compensation will be allowed for expenses due to failure to discover site conditions which affect the work.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Only specified material shall be utilized in the work of this Section unless substitutions have been approved in accordance with the General Conditions and Division 1 Sections of the Specifications.
- B. All materials shall be new and unused, of the best quality for the intended use, and shall be listed by the ASA, AGA, and UL as meeting their requirements and bearing their label wherever standards have been established and label services are regularly furnished by them.

2.2 PIPE AND FITTINGS

A. Gas Piping

- 1. Above Ground - Schedule 40 black steel.
 - a. All concealed pipe and all pipe 2-1/2” and larger shall be welded. Fittings for welded pipe shall be seamless steel with welded neck.
 - b. All accessible pipe 2” and smaller shall be threaded. Fittings for threaded pipe shall be 150-lb. malleable iron, screwed and banded.
- 2. Below Grade – Schedule 40 black steel.
 - a. Schedule 40 black steel pipe conforming to ASTM A-120 with extruded plastic coating, threaded malleable iron fittings, wrapped with UPC-approved 20 mil PVC pipe wrap.
- 3. Below Grade – Polyethylene Yellow Gas Piping
 - a. Polyethylene PE2406 yellow gas piping with fuse-sealed connections and IAPMO listed anodless steel risers may be substituted for buried steel pipe if installed by contractors with qualification certificates.
 - b. Underground lines shall be Performance Pipe, “DriscoPlex 6500” PE2406 polyethylene pipe and fittings for underground gas distribution. The polyethylene plastic pipe and heat fusion fittings shall meet the requirements of ASTM D 2513.
 - c. The pipe and fitting manufacturer shall be ISO Certified in accordance with the current edition of ISO 9001 and a documented quality management system that defines product specifications and manufacturing and quality assurance procedures that assure conformance with customer and applicable regulatory requirements.
 - d. A licensed and bonded Contractor shall perform all underground gas distribution piping construction work. The Contractor shall secure all necessary permits before commencing construction.
 - e. Materials used for the manufacture of polyethylene pipe and fittings shall be PE 2708 (PE2406) medium density polyethylene meeting cell classification 234373E per ASTM D 3350; and shall be Listed in Plastic Pipe Institute TR-r with standard grade HDB ratings of 1250 psi at 73°F, and 1000 psi at 140°F. All pipe and

fittings materials shall be opaque yellow in color. Materials shall be stabilized against ultraviolet deterioration and suitable for outdoor storage for at least 4 years.

B. Condensate Piping

1. Type M, hard temper, copper with wrought copper or cast brass fittings. Joints shall be made up with “Stay-Safe 50” lead free solder.
2. Schedule 40 PVC-DWV may be substituted for rooftop condensate drain piping, provided that it is installed in compliance with ASTM F1866 with PVC socket fittings and solvent joints.

2.3 UNIONS

- A. Steel pipe unions shall be malleable iron, 150lb., ground joint, Grinnell Fig. 463.
- B. Copper pipe unions shall be soldered joint, Nibco series 633 or 733, Mueller, or equal.
- C. Dielectric unions shall be EPCO or equal.

2.4 VALVES, SPECIALTIES

A. Gas Shut-off Valves:

1. At Building Service: Homestead Fig. 601, semi-steel, lubricated plug, lever handle, 200. Lb. Install CALIFORNIA Series 300 seismic actuated shut off valve at entrance to building. Brace per manufacturer’s instructions.
2. At Connection to Equipment: Jomar T-203 gas ball valves, ¼-turn, hot forged brass, 2-piece design, standard port, appliance type with side tap/drain. Provide with ADA certified stainless steel flex connection 12” max.

- B. Gas Pressure Regulators: American Regulator, Series 1813C. Regulators shall be sized for full gas capacity of equipment as scheduled on the Drawings. Inlet pressure shall be 5 psig. Outlet pressure shall be 7” water column. Regulators installed indoors shall have relief opening piped to outdoors. Size relief pipe in accordance with ANSI Z223.1 “National Fuel Gas Code.”

2.5 HANGERS, SUPPORTS

- A. Installation of piping shall be such that damage cannot result through loading, expansion, or contraction of piping. Anchors shall be installed to obtain uniformity of pipe movement.
- B. Pipe supports shall be spaced sufficiently close to support pipes properly without formation of pockets. Hangers shall be installed at ends of mains and branches and maximum intermediate spacing shall be as follows:

	MAXIMUM SPACING, (FT.)		MINIMUM ROD DIAMETER	
	Pipe Diameter, Inches		Pipe Dia.	Rod Dia.
	1” & Less	1-1/4” & More	Inches	Inches
Steel	8	10	2 & Less	3/8
Copper	6	8	2-1/2 to 3	½
Cast Iron	5 (One min. per length & fitting)		4 & Larger	5/8

- C. Pipe hangers shall be Superstrut, B-Line, or equivalent Grinnell. All hangers shall be electrochromate finished. Hanger rods shall have electro-galvanized finish.
- D. Steel pipe, cast iron soil pipe: C-711 pipe hangers.
- E. Copper tubing: C-711 pipe hanger complete with C-716 isolator.
- F. Trapeze Hangers
 - 1. Grouped pipes may be supported by A-1200 channel bolted to rods.
 - 2. Copper and steel pipe shall be attached to channels with A-716 "Cush-A-Clamp."
- G. Cast iron soil pipe shall be supported with C-711 pipe hangers with rods attached to the bottom of channels.
- H. Point of Support Connectors
 - 1. Wood Construction
 - a. 540 side beam hanger for stationary pipes.
 - b. S-541 for pipes subject to movement.
 - 2. Vertical Pipe Risers: Vertical pipes risers shall be securely supported with C-720 pipe clamps (C-720P for bare cold water pipe) anchored to construction.
- I. No valve or piece of equipment shall be used to support piping.

2.6 SLEEVES, WALL PLATES

- A. Service pipe through exterior wall, roofs: Crane Style BC wall and ceiling plates; chrome plated at finished rooms.
- B. Pipes through, under footings: 18 gauge iron sleeves two diameters larger than pipe, cast in concrete, annular space filled with mastic or plastic bituminous cement.
- C. Pipes through fire rated walls shall be protected with fire retardant mastic as detailed on the Drawings. Installation shall be in full accordance with the requirements of the UL system number. Hilti or approved equal.
- D. Wall and ceiling plates: Crane Style BC or equal; chrome plated at finished rooms.
- E. Pipes through floors, interior concrete walls, and through fire rated wall and smoke stop partitions: 18 gauge iron sleeves, two diameters large than pipe, annular space filled with 3M Brand Fire Barrier CP-25 caulk.
- F. Pipes through 1-hour walls shall be protected with fire retardant mastic as detailed on the Drawings. Installation shall be in full accordance with the requirements of the UL system number. Hilti or approved equal.

2.7 ACCESS DOORS

- A. Where construction is not inherently accessible, provide adequately sized and conveniently located access doors in ceiling, walls, and furring for servicing valves, equipment, etc.
- B. Access doors shall be Karp, Milcor, or equal, prime coated steel for all surfaces except ceramic tile, 12" x 12" minimum size as required. Locks shall be flush, screwdriver operated.
 - 1. Style KDW for gypsum board surfaces.
 - 2. Style PL for plaster surfaces.
 - 3. Style 210 for acoustic tile surfaces.
 - 4. Style DSC 214-M satin finish stainless steel at ceramic tile surfaces.
 - 5. Style "Fire Rated" at rated ceilings and walls.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

- A. This Contractor shall be held to have examined the site and compared it with the Contract Documents, and to adequately understand the conditions under which the work is to be performed. In the event of discrepancy, this Contractor shall notify the Architect and proceed as directed. This Contractor shall be held responsible for all existing conditions, whether or not accurately described, and no allowance shall subsequently be made on his behalf for any error, omission, or extra expense due to failure or neglect to make such examination and notification.
- B. Prior to commencing the work of this Section, this Contractor shall inspect the installed work of other trades and verify that their work is sufficiently complete to permit the start of work under this Section and that the completed work will be in complete accordance with the original design. In the event of discrepancy immediately notify the Architect and proceed as directed.

3.2 ACCESSIBILITY

- A. Equipment shall be placed and piping connections made in such a manner that all routine adjustments and maintenance operations may be carried out without inconvenience and so that all code requirements for clearances are maintained.

3.3 VIBRATION AND SOUND CONTROL

- A. Make all necessary provisions to prevent the transmission of vibration to the building structure, including flexible pipe connections to motor driven equipment, resilient mounting for piping, and sealing off pipe and duct penetrations of walls and roof.

3.4 PIPING INSTALLATION – GENERAL

- A. Rough in shall proceed as rapidly as general construction will permit. All rough-in shall be complete, at locations verified by Architect and Owner, and tested and inspected prior to installation of concrete, lath, plaster, gypsum wallboard, or other finishes.

- B. All piping shall be concealed in finished rooms, installed in furred walls and partitions. Where furred or suspended ceilings occur, piping shall be installed in the concealed space at points adjacent to beams and/or other structural members, and coordinated with ductwork and equipment. Where exposed piping occurs, it shall be installed parallel to or at right angles to building walls, unless specifically shown otherwise on the Drawings.
- C. Installation of piping shall be such that damage cannot result, through thermal expansion or contraction, to piping, building, or pipe hangers and supports. Anchors shall be installed at midpoints of all runs in main piping for the purpose of localizing pipe expansion or prevention of creepage.
- D. All pipe lines shall be installed free from traps and air pockets, true to line and grade, with suitable supports properly space. All piping shall be installed without undue stresses and with provision for expansion and contraction.
- E. All piping shall be new and free from foreign substances. American standard pipe threads shall be used for IPS threaded work. Joints in threaded piping shall be made up with Teflon tape applied to the male threads only. No screwed pipe joints shall be caulked or packed with rope or other packing materials. Pipe shall be free from tool marks, threads cut accurately with not more than two (2) threads showing beyond fitting. Friction wrenches shall not be used with plated, polished, or soft metal piping. All changes in pipe size shall be made with reducing fitting. Bushings will not be permitted.
- F. Protect unattended openings in piping during construction.
- G. Weld all pipe 2.5 inches and larger. Use the following procedure. All welders must be AWS certified. AWS B2.1 SMAW 6G Pipe Welding Procedure Specifications.

Welding process: SMAW	Grove Angle: 60 degrees
Position: 6G Fixed position	Material/Spec: A 106
Weld Progression: Up	Thickness (pipe/tube): Groove (in.) .280
Backing: No	Notes: Sch. 40 Pipe
Current/Polarity: DCEP	Filler Metal Class: E6010Rt/E7018F1
Root Opening: 1/16 to 1/8	Other Filler Metal Class: Rt. 1/8, 3/32 filler

- H. Welded joints shall be beveled and butt-welded. Reductions of pipe shall be made with forged steel welding fittings. Branch reductions of two or more pipe sizes smaller than the main, may be Bonney "Weld-O-Let" fittings, or equal. Job fabricated reductions and branches shall not be used. All pipe burrs shall be reamed out. Welding rods shall be as follows, or approved equal:

<u>Pipe Size</u>	<u>Arc Welding</u>	<u>Gas Welding</u>
2" and larger	Fleetweld #5	Oxweld #1 or Page Hi-Test M
1 1/2" and larger	None	Oxweld #1 or Page Hi-Test M

- I. No water or drainage piping shall pass over electrical equipment unless adequate protection is provided to prevent damage by leaks or condensation.
- J. All copper tubing shall be formed in a workmanlike manner, in accordance with the Pipe and Tube Bending Handbook of the Copper and Brass Research Association. A tube bender giving

support to the periphery of the tube shall be used. The tubing shall be protected against flattening or other injury.

- K. All copper connections and joints shall be made in accordance with the Copper Tube Handbook, Copper and Brass Research Association. No swaged connections will be permitted. All valves, pumps, and similar equipment shall be connected to copper piping through union or flange adapter fittings.
- L. Valves, cocks, etc., shall be installed to allow convenient accessibility and operation.
- M. Unions and flanges shall be installed to allow convenient replacement of all equipment and clearing tubes.
- N. A union connection shall be installed downstream from all valves, at equipment connections and at other locations as required or directed.
- O. Shut off valves shall be provided in all main services, and where required to permit proper servicing of equipment. Valves of one type shall be of one manufacturer.
- P. All valves shall be of the same size as the pipelines in which they are installed, unless specifically sized on the Drawings. All hand controlled line valves shall be ball valves, except where throttling control or frequent operation is required, in which case globe or angle valves shall be used. Globe valves in horizontal lines shall be installed with stem in horizontal to permit line draining. All globe and angle valves shall be installed to close against pressure. Disc valves shall have discs suitable for the services for which they are to be used.
- Q. All valves shall be accessible and shall not be installed with the stems below the horizontal plane. Provide access panels at walls, ceilings, or floors.
- R. Provide prime coated escutcheon plates at all points where exposed piping penetrates finished wall ceilings or floors.
- S. Cutting or boring of joists or other structural members shall be done only when alternative routing is impossible and only upon written approval of the Architect or Owner.

3.5 INSTALLATION, PIPING

- A. Natural Gas Piping
 1. Natural gas piping shall slope back to meter, where possible.
 2. Bottom of vertical natural gas lines shall be fitted with 6" long capped drip legs.
 3. In addition to the main shut-off valve, a natural gas stopcock shall be installed at each piece of gas-fired equipment.
- B. Condensate Piping
 1. Indirect waste piping shall be installed to a uniform minimum grade of 1/4" per foot unless otherwise noted.
 2. Changes in direction of indirect waste piping shall be accomplished by the use of appropriate drainage fittings.

3. Drilling and tapping of indirect waste pipes and the use of saddle hubs and bands are prohibited.

C. Flashing

1. All roof and wall penetrations shall be flashed and counterflashed water tight with 26 gauge sheet metal, except as noted.
2. Vents through roof shall be flashed with Semco #1100-4 lead flashing assemblies. Flashing shall extend over top of pipe and shall be turned down inside top of pipe.

3.6 INSTALLATION, HANGERS & SUPPORTS

- A. Installation of piping shall be such that damage cannot result through loading, expansion, or contraction of piping. Anchors shall be installed to obtain uniformity of pipe movement.
- B. Hanger rod sizes shall be no smaller than 3/8-inch for pipe and tube sizes 1/2 to 4 inches and 1/2 inch for sizes 5-8 inches.
- C. Pipe supports shall be spaced sufficiently close to support pipes properly without formation of pockets. Hangers shall be installed at ends of mains and branches. Maximum horizontal support spacing shall be as follows:
 1. Steel and Tinned Copper Pipe for Gas: 6 feet for 1/2 inch pipe; 8 feet for sizes 3/4 to 1 inch, and 10 feet for sizes 1 1/4 inch and larger.
 2. Copper Tube and Pipe, soldered or brazed: 6 feet for pipe sizes 1 1/2 inches and smaller and 10 feet for sizes 2 inches and larger.
 3. Hubless Cast-Iron shall be supported at every other joint, unless over 4 feet, then support each joint. Support adjacent to joint, not to exceed 18 inches, brace at not more than 40 foot intervals to prevent horizontal movement. Support at each horizontal branch connection. Hangers shall not be placed on the coupling.
- D. No valve or piece of equipment shall be used to support piping.
- E. Pipes through studs or joists shall be isolated from structure with properly sized Hubbard "Hole-Rite" suspension clamps.

3.7 TESTING, INSPECTIONS

A. General

1. This Contractor shall not allow or cause any work of this Section to be covered or enclosed until it has been inspected, tested, and approved by the Architect and the authorities having jurisdictions over the work. Should any of this work be enclosed or covered up before such inspection, testing, and approval, this Contractor shall uncover the work, have the necessary inspections, tests, and approvals made and, at no expense to the Owner, make all repairs necessary to restore both his work and that of other contractors that may have been damaged, to be in conformity with the Contract Documents.

B. Tests

1. This Contractor shall make all tests required by all local, state, and federal laws, codes, ordinances, and regulations having jurisdiction over this work.
2. Furnish all necessary labor, materials, and equipment for conducting tests, and pay all expenses in connection therewith. Should leaks develop while testing, repairs shall be made, and tests shall be repeated until a satisfactory test is obtained.
3. Water Piping shall be hydrostatically tested for 6 hours at 150 psi. All equipment shall be tested water tight at utility pressure.
4. Drainage and Vent Piping shall be tested for 1 hour by plugging all outlets and filling the pipes with water to the top of vertical sections of pipes. No loss of water shall be permitted.

3.8 ADJUSTING

- A. Properly adjust all stops, and controls, and demonstrate safe and satisfactory operation of all equipment.

3.9 CLEANING

- A. Flush all water piping systems. Remove, clean, and replace all strainer baskets prior to final inspection.
- B. Blow out all compressible fluid piping with compressed air before connecting with regulators or equipment.

3.10 CLEANUP

- A. Upon completion of the work of this Section, remove all surplus material, debris, and equipment associated with or used in the performance of this work.

END OF SECTION 220000